

Geriatric equine population in Germany – health and management insights

Antonia C. Czerner¹, Arno Lindner², Annette Zeyner³, Monika Wensch-Dorendorf³, Heidrun Gehlen¹

¹ Equine Clinic, Veterinary Department, Freie Universität Berlin, Oertzenweg 19b, 14163 Berlin, Germany

² Verein zur Förderung der Forschung im Pferdesport e.V., c/o Dr. Arno Lindner, Heinrich-Roettgen-Str. 20, 52428 Juelich, Germany

³ Institute of Agricultural and Nutritional Sciences, Martin Luther University Halle-Wittenberg, Theodor-Lieser-Straße 11, 06120 Halle (Saale), Germany

Summary: In recent decades, an increasing proportion of domestic horses in Germany appears to reach advanced age. However, scientific population data regarding the health status and management of senior equids remain limited. To address these research gaps, this purely descriptive cross-sectional study aimed to characterise owner-perceived health conditions, multi-morbidity patterns, and healthcare management routines in horses aged 20 years and older in Germany. Because all data are entirely based on owner-reported questionnaires without objective clinical verification, the objective was strictly to provide descriptive insights into owner observations and reported care practices across age groups, horse types, and sexes, rather than establishing clinically confirmed diagnostic prevalences or causal relationships.

Data were collected through an exploratory online survey using easyfeedback software, accessible to horse owners via the website of the Verein zur Förderung der Forschung im Pferdesport e.V. (FFP) between April 5 and June 15, 2023. Out of 1541 completed questionnaires, responses covering multiple horses were excluded to ensure case comparability, leaving 923 single-horse questionnaires. A total of 919 horses aged 20 to 39 years (mean age 25.74 ± 3.96 years) met all criteria for age-stratified descriptive evaluation. Horses were categorised into three 5-year age intervals based on reported age: 20–24 years (42.2 %, $n = 388$), 25–29 years (38.1 %, $n = 350$), and ≥ 30 years (19.7 %, $n = 181$) (Figure 1 / Abbildung 1). Based on owner-specified breeds, horses were categorised into four metabolic type groups: Warmbloods (57.6 %, $n = 530$), Ponies and small horse breeds (24.9 %, $n = 230$), Thoroughbreds and Partbreds (9.6 %, $n = 88$), and Others (7.8 %, $n = 72$) (Figure 2 / Abbildung 2, Table 1 / Tabelle 1). The questionnaire comprised 25 questions collecting subjective owner observations on health by organ system, as well as deworming, vaccination, dental, and farriery practices. Statistical analysis was conducted in SAS Studio. Given the exploratory, non-confirmatory nature of the survey, analysis was restricted to descriptive summaries (counts, percentages, mean $\pm$ standard deviation) and descriptive group comparisons using odds ratios (OR) with 95 % confidence intervals (95 % CI), without applying formal corrections for multiple testing or inferring causal associations.

All findings represent owner-reported observations rather than clinically diagnosed conditions. Overall, the most frequently reported health conditions by owners were orthopaedic diseases (66.7 %, $n = 580$), reduced mobility (65.9 %, $n = 602$), dental diseases (57.2 %, $n = 497$), skin diseases (35.9 %, $n = 289$), cardiovascular diseases (32.7 %, $n = 255$), gastrointestinal diseases (32.3 %, $n = 257$), neurological diseases (31.1 %, $n = 237$), respiratory diseases (28.5 %, $n = 233$), ocular diseases (28.1 %, $n = 223$), infectious diseases (21.2 %, $n = 183$), and hearing problems (18.1 %, $n = 133$) (Table 2 / Tabelle 2). Owner-reported comorbidity (defined as the concurrent reporting of three or more conditions) was noted in 68.2 % of horses ($n = 629$) and showed a descriptive increase in older age groups ($p < 0.001$), reaching 80.0 % in horses reported to be ≥ 30 years old (Table 2 / Tabelle 2). Owners of horses aged 20–24 years reported lower odds of comorbidity compared to owners of horses aged 25–29 years (OR = 0.53, 95 % CI [0.36–0.76]) and ≥ 30 years (OR = 0.36, 95 % CI [0.22–0.60]) (Table 2 / Tabelle 2). Descriptive age-related increases in owner reports were also recorded for reduced mobility ($p < 0.001$), dental disorders ($p < 0.001$), gastrointestinal conditions ($p = 0.023$), hearing issues ($p < 0.001$), cardiovascular problems ($p < 0.001$), and neurological signs ($p < 0.001$) (Table 2 / Tabelle 2). Conversely, owner-reported respiratory diseases showed a lower proportion in older age categories ($p = 0.012$; Table 2 / Tabelle 2). No descriptive age trends were observed for reported orthopaedic, skin, or infectious conditions.

Differences were also observed across owner-reported sex and type groups. Mares were reported with higher proportions of orthopaedic (OR = 1.37, $p = 0.032$) and ocular disorders (OR = 1.41, $p = 0.032$), but lower proportions of dental (OR = 0.64, $p = 0.001$) and gastrointestinal disorders (OR = 0.71, $p = 0.029$) than geldings/stallions. Owners of Warmbloods (OR = 0.53, $p = 0.012$) and ponies/small horse breeds (OR = 0.53, $p = 0.021$) reported lower dental disease rates than owners of Thoroughbreds/Partbreds. Warmblood owners reported skin diseases (OR = 1.51, $p = 0.022$) and hearing problems (OR = 2.30, $p = 0.001$) more frequently than pony owners. Regarding healthcare practices described by owners, 85.0 % of horses ($n = 783$) had a general vaccination status, but reported coverage against Equine Influenza (46.0 % annual, 11.8 % biannual, 42.2 % unvaccinated) and Equine Herpesvirus (18.0 %) was lower in older age categories (Table 3 / Tabelle 3, Table 4 / Tabelle 4). Influenza vaccination was reported more frequently in horses aged 20–24 years than in those aged 25–29 years (OR = 1.55, $p < 0.001$) and ≥ 30 years (OR = 2.27, $p < 0.001$; Table 4 / Tabelle 4). Warmblood owners reported higher vaccination rates against Influenza (OR = 1.68, $p = 0.001$) and EHV (OR = 1.70, $p = 0.017$) than pony owners. Anthelmintic care was described as multiple treatments per year by 69.1 % ($n = 637$) of owners, selective deworming by

25.4 % ($n = 234$), and annual treatment by 5.5 % ($n = 51$). Annual dental examinations were reported for 71.2 % ($n = 653$) of horses, while 16.0 % ($n = 147$) were examined twice yearly or more. Hoof trimming every 6–8 weeks was reported in 89.3 % of cases ($n = 818$), mostly by certified farriers (75.0 %, $n = 659$) (Table 5 / Tabelle 5). Barefoot management (47.4 %, $n = 436$) was reported more frequently in older age groups compared to two-shoe (20.6 %, $n = 189$) and four-shoe (18.9 %, $n = 174$) options (Table 5 / Tabelle 5). Because this study relies entirely on unverified owner-reported questionnaire data, these findings must be interpreted strictly as descriptive reflections of owner perceptions, experiences, and reported management routines rather than confirmed veterinary medical data. The descriptive trends highlight potential knowledge gaps among owners, particularly regarding age-related comorbidity and declining vaccination coverage in older horses. To overcome the inherent limitations of owner reporting, future research incorporating objective veterinary clinical examinations is essential to validate these findings and establish evidence-based standards for geriatric equine welfare.

Keywords: horse; disease; ageing; survey; vaccination; worming

Citation: Czerner AC, Lindner A, Zeyner A, Wensch-Dorendorf M, Gehlen H (2026) Geriatric equine population in Germany – health and management insights. *Comp Pferdehkl* 2, 380–392; doi.org/10.21836/Compendium20260501

Correspondence: Heidrun Gehlen, Equine Clinic, Veterinary Department, Freie Universitaet Berlin, Oertzenweg 19b, 14163 Berlin, Germany
E-Mail: heidrun.gehlen@fu-berlin.de

submitted: March 23, 2026 accepted: April 21, 2026

Introduction

Since their domestication approximately 5,500 years ago, horses have lived and worked closely alongside humans^[1]. In recent decades, an increasing number of domestic horses appear to reach advanced age. However, there is currently no robust longitudinal evidence at the population level demonstrating a true increase in biological lifespan in Germany or worldwide. In Germany the proportion of horses over 16 years old in sports has steadily increased from 9.9 % in 2019 to 12.4 % in 2024, according to statistics from the German Fédération Équestre Nationale (FN)^[2].

Horses over the age of 20 are generally classified as geriatric, with many owners perceiving this age as the onset of old age in their animals^[3], and were found to be significantly more likely to have a history of colic, dental disease, neoplasia, lameness other than laminitis, and pituitary disorders compared to younger animals^[4].

As horses age, specific physiological and health-related changes occur, affecting both animal welfare and the demands placed on health management. This includes inflammaging, a chronic low-grade inflammatory process linked to immunosenescence and increased vulnerability to age-related diseases^[5,6]. These changes require a differentiated and well-founded approach to the needs of older horses.

There is still limited scientific data on the demographics, housing, health and management of the senior segment of the equine population.

To gain insights into the ageing horse population in Germany, a questionnaire was developed in preparation for the 40th *Tagung zur Pferdegesundheit* (Conference on

Equine Health) in 2023 — *Das alte Pferd im Fokus* ("The ageing horse in focus") — by the *Verein zur Förderung der Forschung im Pferdesport* (Association for the Promotion of Research in Equestrian Sports, FFP). This questionnaire aimed to collect data on the general health and behaviour as well as general and nutritional management of geriatric horses in Germany.

By describing current health status and management practices in older horses, this study provides data that may contribute to discussions on the care and management of the ageing equine population.

Differences in age and horse type were examined to explore potential variations in owner-reported disease occurrence and management practices. It was assumed that increasing age may be linked to differences in the proportions of certain health conditions and to differences in preventive care and management routines. In addition, horse type was considered as a factor that may influence owner-reported health status and management practices. Vaccination frequency, deworming routines, dental examination intervals, and hoof care practices were therefore described and compared across different age groups and horse types.

Materials and Methods

Data Collection

The survey was created using the easyfeedback software (easyfeedback GmbH, Koblenz, Germany) and published on the FFP website. The survey service was bought for 1000 participants. It started April 5, 2023, and was scheduled to be open for respondent until June 15. However, the

maximum number was reached May 5, 2023, already. Thereafter it was decided to buy capacity for further 1000 participants. By June 15 the survey was closed with a total of 1541 completed questionnaires, of which 1338 (86.8 %) were fully completed. For the present analysis, only questionnaires referring to a single horse ($n = 923$) were included. Responses that covered multiple horses were excluded, as individual answers could not be clearly attributed to a specific horse or age group, which would have reduced the comparability between cases.

The questionnaire consisted of 25 questions: 13 closed-ended, seven open-ended and five mixed-format with tick boxes and free-text fields.

It collected demographic data (age, breed and sex) and detailed health information by organ system. Responses (“remained the same,” “decreased,” “increased,” “particularly noticeable,” and “slightly”) were grouped into two categories (affected/not affected) for analysis of age-related trends.

To enable age-related comparisons, horses were divided into three categories: 20–24 years (age group one), 25–29 years (age group two), and ≥ 30 years (age group three). Five-year intervals were selected to achieve groups of roughly similar size while preserving distinctions between different stages of advanced age.

To enable the analysis of potential differences between horse types, owner-reported breeds were categorised into four type groups according to metabolic characteristics^[7]: These included Warmbloods, Thoroughbreds/Partbreds, and ponies/small horse breeds (robust types). Breeds that could not be clearly allocated to one of these categories were assigned to the group “others”.

Further questions addressed vaccination and worming routines, dental and hoof care, which form a central part of this study. Housing conditions were also recorded, including housing type, feeding, social interaction, activity levels, and daily time spent on care. The latter has been published already^[8].

The questionnaire was designed primarily with fixed response categories, and in most cases no separate options such as “not applicable” or “no response” were included. Participants therefore usually had to choose from the provided answer categories. Missing responses to individual questions did not result in exclusion of the entire questionnaire. Instead, data from the respective horse were omitted only for analyses of the unanswered variable, while all remaining information was included in the dataset. Consequently, sample sizes varied slightly between individual analyses and variables.

Following a complete review, open-ended (free-text) responses were categorised into thematically meaningful groups, to which individual responses were assigned for subsequent analysis.

Statistical Analysis

Data were exported from easyfeedback (easyfeedback GmbH) to Microsoft Excel Version 16.89.1 (24091630) (Microsoft Corporation, Redmond, WA, USA), where they were processed and structured. To ensure a consistent dataset suitable for analysis, raw entries were carefully cleaned, checked for completeness, and systematically organised.

All statistical analyses were performed using SAS Studio (SAS Institute Inc., Cary, NC, USA).

Categorical variables were summarised as counts and percentages, while age was reported as mean $\pm$ standard deviation. Percentages were calculated based on the total number of horses for which the respective question had been answered.

For statistically significant descriptive differences between groups ($p < 0.05$), odds ratios (OR) with corresponding 95 % confidence intervals (95 % CI) were reported to describe the magnitude and uncertainty of observed group differences. Given the cross-sectional and exploratory nature of the study, these analyses were intended solely to provide descriptive comparisons and should not be interpreted as evidence of causal relationships or formal associations. No formal correction for multiple testing was applied; therefore, the findings should be interpreted with appropriate caution.

Results

Study population

Among the 923 initially received single-horse questionnaires, 919 fulfilled the predefined inclusion criteria and were included in the analysis stratified by age, representing horses aged 20 to 39 years (mean $\pm$ SD: 25.74 $\pm$ 3.96 years). Figure 1 shows the distribution across the predefined age groups. Figure 2 presents the number of horses within each type group, while the age distribution across the individual type groups is summarised in Table 1.

In pairwise comparison, Warmbloods were proportionally significantly more prevalent than ponies and small horse breeds in age group one compared with age groups two (OR [95 % CI] = 1.72 [1.20–2.46], $p = 0.003$) and three (OR [95 % CI] = 2.56 [1.68–3.87], $p < 0.001$). Moreover, Warmbloods were significantly more prevalent than Thoroughbreds and Partbreds in age group one compared with age group three (OR [95 % CI] = 1.86 [1.02–3.39], $p = 0.042$).

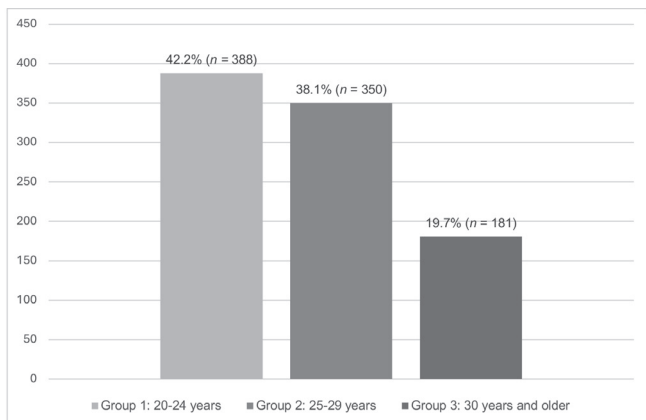


Figure 1 – Owner-reported distribution of the 919 study horses across the predefined age groups (20–24 years, 25–29 years, and ≥ 30 years; mean age 25.7 ± 3.96 years; percentages with sample size n).

Verteilung der 919 Studienpferde auf die vordefinierten Altersgruppen (20–24 Jahre, 25–29 Jahre und ≥ 30 Jahre; mittleres Alter $25,7 \pm 3,96$ Jahre; Prozentangaben mit Stichprobengröße n).

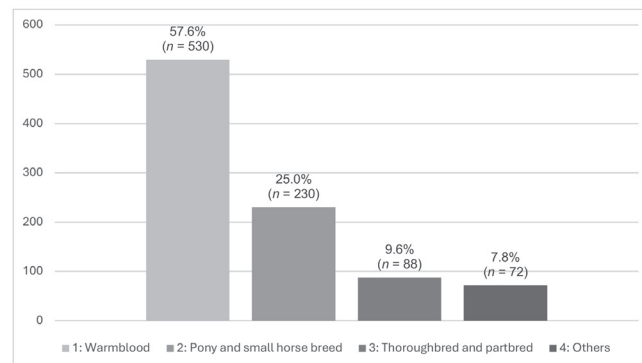


Figure 2 – Owner-reported distribution of the study horses across four type groups (Warmblood, Pony and small horse breed, Thoroughbred and Partbred, Others; percentages with sample size n).

Verteilung der Studienpferde auf vier Typgruppen (Warmblut, Pony und Kleinpferderassen, Vollblut und Halbblut, Sonstige; Prozentangaben mit Stichprobengröße n).

Table 1 – Owner-reported mean age and age distributions in the four horse type groups (Warmblood, Pony and small horse breed, Thoroughbred and Partbred, Others). Mean age is given in years.

Von den Besitzern angegebenes mittleres Alter und Altersverteilung in den vier Pferdetypgruppen (Warmblut, Pony und Kleinpferderassen, Vollblut und Halbblut, Sonstige). Das mittlere Alter ist in Jahren angegeben.

Type	Mean Age ($\pm$ SD)	20–24 years	25–29 years	≥ 30 years
Warmblood	25.4 ($\pm$ 3.85)	47.1 % (n = 249)	36.3 % (n = 192)	16.6 % (n = 88)
Pony and small horse breed	26.7 ($\pm$ 4.02)	31.0 % (n = 71)	41.1 % (n = 94)	28.0 % (n = 64)
Thoroughbred and Partbred	26.3 ($\pm$ 4.23)	36.4 % (n = 32)	39.8 % (n = 35)	23.9 % (n = 21)
Others	24.8 ($\pm$ 3.66)	50.7 % (n = 36)	40.9 % (n = 29)	8.5 % (n = 6)

The sex distribution showed that 57.9 % (n = 534) of the horses were geldings and stallions and 42.1 % (n = 388) were mares. There were no statistically significant differences in reported sex distribution across age and horse types.

Reported Diseases

Table 2 presents observed significant differences in disease proportions across age groups for several conditions, including comorbidity (defined as the simultaneous occurrence of three or more diseases). No differences in the proportions of infectious (21.2 %, n = 183), orthopaedic (66.7 %, n = 580), and skin diseases (35.9 %, n = 289) were observed between age groups.

Differences in the proportions of some reported diseases were observed between sex groups. Mares showed a higher proportion of reported orthopaedic disorders compared to geldings and stallions (OR [95 % CI] = 1.37 [1.03–1.83], p = 0.032). In contrast, mares were less often reported to show dental disorders (OR [95 % CI] = 0.64 [0.49–0.84], p = 0.001). Similarly, mares showed lower proportions of reported gastrointestinal disorders (OR [95 % CI] = 0.71 [0.52–0.97], p = 0.029) and higher proportions of ocular disorders (OR [95 % CI] = 1.41 [1.03–1.92], p = 0.032) compared to geldings and stallions.

Warmbloods (OR [95 % CI] = 0.53 [0.32–0.87], p = 0.012) and ponies and small horse breeds (OR [95 % CI] = 0.53 [0.31–0.91], p = 0.021) showed lower propor-

tions of reported dental disease compared with Thoroughbreds and Partbreds. In addition, Warmbloods were more often reported to have skin diseases (OR [95 % CI] = 1.51

[1.06–2.15], $p = 0.022$) and hearing problems (OR [95 % CI] = 2.30 [1.37–3.87], $p = 0.001$) compared with ponies and small horse breeds.

Table 2 – Descriptive differences in owner-reported diseases among three age groups of old horses (≥ 20 years). Rows within a condition with different letters denote a significant difference. Age group is given in years.

Deskriptive Unterschiede der von den Besitzern berichteten Erkrankungen zwischen drei Altersgruppen geriatrischer Pferde (≥ 20 Jahre). Zeilen innerhalb einer Erkrankung mit unterschiedlichen Buchstaben kennzeichnen einen signifikanten Unterschied. Die Altersgruppen sind in Jahren angegeben.

Disease	Owner-reported prevalence	Age group	Owner-reported proportion	OR 20–24 vs.	95 % CI	p-value
Reduced mobility	65.9 % ($n = 602$)	20–24	0.56 ^a			<0.001
		25–29	0.71 ^b	0.52	0.36–0.76	
		≥ 30	0.77 ^c	0.39	0.24–0.63	
Dental disease	57.2 % ($n = 497$)	20–24	0.45 ^a			<0.001
		25–29	0.62 ^b	0.50	0.35–0.72	
		≥ 30	0.75 ^c	0.28	0.17–0.44	
Gastrointestinal disease	32.3 % ($n = 257$)	20–24	0.27 ^a			0.023
		25–29	0.36 ^b	0.67	0.44–0.999	
		≥ 30	0.37 ^b	0.62	0.39–1.01	
Respiratory disease	28.5 % ($n = 233$)	20–24	0.33 ^a			0.012
		25–29	0.27 ^{a,b}	1.38	0.92–2.06	
		≥ 30	0.21 ^b	1.88	1.11–3.17	
Ocular disease	28.1 % ($n = 223$)	20–24	0.23 ^a			0.016
		25–29	0.32 ^b	0.63	0.41–0.96	
		≥ 30	0.32 ^b	0.61	0.37–1.01	
Hearing problem	18.1 % ($n = 133$)	20–24	0.08 ^a			<0.001
		25–29	0.22 ^b	0.32	0.18–0.58	
		≥ 30	0.30 ^c	0.22	0.11–0.41	
Cardiovascular disease	32.7 % ($n = 255$)	20–24	0.24 ^a			<0.001
		25–29	0.37 ^b	0.54	0.36–0.82	
		≥ 30	0.41 ^b	0.45	0.28–0.74	
Neurological disease	31.1 % ($n = 237$)	20–24	0.23 ^a			<0.001
		25–29	0.34 ^b	0.58	0.38–0.89	
		≥ 30	0.41 ^b	0.44	0.27–0.72	
Comorbidity	68.2 % ($n = 629$)	20–24	0.59 ^a			<0.001
		25–29	0.73 ^b	0.53	0.36–0.76	
		≥ 30	0.80 ^c	0.36	0.22–0.60	

Vaccination Regimen

Further details can be found in Table 3. Within this sample, significant differences in owner-reported vaccination rates for Equine Influenza and Equine Herpesvirus (EHV) were observed between most age groups (Table 4).

Warmbloods showed significantly higher owner-reported proportions of vaccination against Equine Influenza (OR [95 % CI] = 1.68 [1.23–2.30], $p = 0.001$) and Equine Herpesvirus (OR [95 % CI] = 1.70 [1.10–2.64],

$p = 0.017$) compared with ponies and small horse breeds in this dataset.

Anthelmintic treatment

In terms of owner-reported worming practices, 25.4 % ($n = 234$) of the horses were managed using a selective approach, 5.5 % ($n = 51$) received a single annual treatment and 69.1 % ($n = 637$) were treated multiple times per year.

Table 3 – Owner-reported vaccination status and vaccination frequencies in old horses (≥ 20 years), including general vaccination status, Equine Influenza and tetanus vaccination schedules, and vaccination coverage against West Nile virus, Equine Herpesvirus (EHV), Dermatophytosis and Rabies.

Von den Besitzern angegebener Impfstatus und Impfhäufigkeiten bei Pferden (≥ 20 Jahre), einschließlich des allgemeinen Impfstatus, der Impfintervalle gegen Equine Influenza und Tetanus sowie der Impfquoten gegen das West-Nil-Virus, das Equine Herpesvirus (EHV), Dermatophytose und Tollwut.

General vaccination	Yes	No
Number	85.0 % ($n = 783$)	15.0 % ($n = 138$)

Equine Influenza	Annually	Twice a year	No vaccination
Number	46.0 % ($n = 422$)	11.8 % ($n = 108$)	42.2 % ($n = 387$)

Tetanus	Annually	Less than annually	No vaccination
Number	39.1 % ($n = 359$)	45.3 % ($n = 415$)	15.6 % ($n = 143$)

Disease	West Nile virus	Equine Herpesvirus (EHV)	Dermatophytosis	Rabies
Number	5.8 % ($n = 53$)	18.0 % ($n = 166$)	1.2 % ($n = 11$)	2.2 % ($n = 20$)

Table 4 – Descriptive differences in owner-reported vaccination rates (Equine Influenza, Equine Herpesvirus) among three age groups of old horses (≥ 20 years). Rows within a condition with different letters denote a significant difference. Age group is given in years.

Deskriptive Unterschiede der von den Besitzern berichteten Impfraten (Equine Influenza, Equines Herpesvirus) zwischen drei Altersgruppen älterer Pferde (≥ 20 Jahre). Zeilen innerhalb einer Impfkategorie mit unterschiedlichen Buchstaben kennzeichnen einen signifikanten Unterschied. Die Altersgruppen sind in Jahren angegeben.

Vaccination	Age group	Owner-reported proportion	OR 20–24 vs.	95 % CI	p-value
Equine Influenza	20–24	0.66 ^a			<0.001
	25–29	0.55 ^b	1.55	1.08–2.21	
	≥ 30	0.46 ^b	2.27	1.47–3.50	
Equine Herpesvirus	20–24	0.23 ^a			0.008
	25–29	0.15 ^b	1.67	1.06–2.63	
	≥ 30	0.14 ^b	1.82	1.02–3.25	

Table 5 – Owner-reported hoof trimming and farriery practices in a elder equine population (≥ 20 years), including trimming frequency, farrier certification status, and type of shoeing.

Von den Besitzern berichtete Hufpflege- und Hufbeschlagspraktiken bei einer Population älterer Pferde (≥ 20 Jahre), einschließlich der Hufbearbeitungsintervalle, des Qualifikationsstatus des Hufbearbeiters sowie der Art des Hufbeschlags.

Frequency	every six to eight weeks	every three months	less frequently
Number	89.3 % ($n = 818$)	9.4 % ($n = 86$)	1.3 % ($n = 12$)

Type of farrier	state-certified	non-certified
Number	75.0 % ($n = 659$)	25.0 % ($n = 220$)

Type of shoeing	Barefoot	Hoof boots	Front shoes	Four shoes
Number	47.4 % ($n = 436$)	13.1 % ($n = 120$)	20.6 % ($n = 189$)	18.9 % ($n = 174$)

There were no age- or type-dependent differences in owner-reported anthelmintic treatment.

Dental Check-ups

Based on information provided by the owners, dental check-ups were performed twice a year or more often in 16.0 % ($n = 147$), once a year in 71.2 % ($n = 653$), less than once a year in 10.4 % ($n = 95$) and never in 2.4 % ($n = 22$) of horses.

Compared with age group two (OR [95 % CI] = 1.60 [1.06–2.42], $p = 0.025$) and three (OR [95 % CI] = 1.92 [1.18–3.11], $p = 0.008$), age group one showed a significantly higher proportion of horses that were checked once per year rather than twice a year or more often.

Differences in reported dental problems were observed between groups with different frequencies of dental check-ups ($p < 0.001$). Horses receiving dental check-ups once a year showed a lower proportion of reported dental problems compared to horses examined twice a year or more often (OR [95 % CI] = 0.27 [0.15–0.48]). Moreover, the proportion of reported dental problems was higher in horses receiving dental check-ups twice a year or more often compared to horses checked less than once a year (OR [95 % CI] = 5.53 [2.55–11.97]).

No differences in dental check-up frequency were observed between horse types.

Hoof Trimming

Details on frequency of trimming, type of farrier and type of shoeing are provided in Table 5.

Barefoot horses were more frequently represented in age group one than in age group three compared with horses fitted with two shoes (OR [95 % CI] = 1.68 [1.05–2.68], $p = 0.029$) and four shoes (OR [95 % CI] = 2.52 [1.46–4.36], $p < 0.001$). Differences were also observed between age groups two and three, with barefoot horses being more frequently represented compared to horses with four shoes (OR [95 % CI] = 2.34 [1.35–4.07], $p = 0.002$).

No differences in the frequency of shoeing, the type of farrier, or the type of shoeing were observed between horse types.

Discussion

The aim of this study was to improve the currently limited scientific knowledge about the management of the possibly growing geriatric horse population in Germany with new insights as well as to demonstrate why it is crucial to address this topic in greater depth. Particular attention was paid to the aspects of diseases, vaccination and anthelmintic administration, dental check-ups and hoof care in geriatric horses.

The enthusiastic participation suggests that horse owners are highly interested in managing their horses in an age-appropriate manner. Although the findings are based solely on owner-reported questionnaire data, they may indicate the importance of addressing knowledge gaps in this area and improving the information available to owners and attending veterinarians caring for geriatric horses to support management in old age.

Study population

The mean age of the horses (25.7 years) is higher than averages reported in other studies on senior horses in Sweden and North America, which were both 24 years^[9,10], but lower than the value of 26.5 years reported in North America^[4]. In contrast, an average age of 20 years was reported in north-west and central England and North Wales^[11], while an average age of 20.7 years was found in Queensland, Australia^[12].

It is important to note that the last two publications also allowed owners of younger horses to participate, which likely explains the differences.

In the current study, 80.3 % of horses were under 30 years old, while 19.7 % were older than 30 years of age. This distribution is comparable to a previous report in horses >20 years (83.7 % aged 20–30, 16.3 % >30)^[11], while another study found 70 % aged 20–25, 24 % 26–30 and 6 % >30^[9].

Assessing the age of senior horses is crucial for understanding their health and management needs. While chronological, physiological, and demographic age are recognized for equine ageing, they do not fully capture a horse's health status, as individual use strongly affects physical condition^[13]. A horse used intensively in sport or labour may show physiological changes faster than one used recreationally. The concept of functional age expands on chronological age by considering the horse's activity and stress levels, allowing a more accurate assessment of health and care needs^[13]. As this study solely relied on chronological age, results should be interpreted with the understanding that this may differ from the functional age.

The largest share of the study population was Warmbloods. The increasing proportion of ponies and small horse breeds in older age classes, reflects the characteristic life-history and metabolic traits^[14]. They typically exhibit a lower basal metabolic rate, high energy efficiency and an overall slower pace of life, resulting in particularly long-lived individuals^[14]. This metabolic profile corresponds to the mechanisms of a "slow pace of life" also described for insular endotherms^[14].

As in other studies on senior horses, males predominated (57.9 %) compared to females (42.1 %)^[10–12]. The cause of this imbalance remains unclear but is consistent across regions and breed compositions.

Reported Diseases

Regarding disease prevalence, dental disorders were more common in this study (57.2 %) compared to another Ger-

man study on horses aged 15 years and older based on owner-reports (17.4 %). Orthopaedic disorders showed a smaller but still notable difference, with 66.7 % of horses reported to be affected in this study versus 48.5 % reported previously^[15].

In geriatric horses, it is particularly important to focus on comorbidity, as multiple concurrent conditions often require specialized management. Based on owner-reported information, comorbidities increased significantly with age, affecting nearly 80 % of horses aged ≥30 years. Awareness of age-related diseases and appropriate management adjustments, such as more frequent veterinary checks or modified housing, are therefore vital. Owners should be informed about potential comorbidities and how to adapt management practices, for example, feeding adjustments for dental diseases to prevent malnutrition or colic^[16,17].

Within this sample, differences in disease proportions were observed across age groups for several of the examined conditions.

The reported increase in dental diseases with age can be explained by equine dental anatomy^[18]: Horses have hypsodont teeth, with anatomical crowns larger than the visible crowns and delayed root closure. Vertical tooth growth occurs mainly during the first six to seven years, after which teeth are pushed toward the chewing surface. All three hard substances (enamel, cementum, dentine) are exposed to the chewing surface. The enamel becomes thinner toward the root apex, so as horses age, the enamel layer on the chewing surface becomes thinner. As the hardest substance in the body, enamel plays a crucial role in grinding and tooth protection. Thinner enamel reduces chewing efficiency and makes the tooth more vulnerable to damage^[18]. This can lead to dental diseases. In advanced stages of enamel wear, "smooth teeth" may develop, whose chewing surfaces are composed only of cementum and dentine. Their smoothness impairs or even averts proper grinding^[16]. Additionally, the tooth tapers apically, and as horses age, this tapering segment moves toward the chewing surface, forming enlarged interdental spaces (diastemata)^[18]. This can lead to tooth instability and feed impaction, potentially resulting in infection. Typical geriatric dental conditions include infundibular caries, Equine Odontoclastic Tooth Resorption and Hypercementosis (EOTRH), wear disorders, pulpitis, and diastemata-associated periodontal diseases^[18].

The observed increase in reduced mobility with age may be linked to musculoskeletal disorders, although the present findings are based solely on descriptive data and do not permit causal interpretation. Osteoarthritis has been identified as the most common condition affecting the muscu-

loskeletal system in geriatric horses, with similar findings also reported in human geriatric medicine ^[19,20]. Age-related chronic inflammation or altered cartilage biomechanics may be responsible, including extracellular matrix remodelling and increased collagen breakdown ^[21].

When interpreting reduced mobility, it must be considered that in an Australian study on aged horses, only 26.4 % of horses showing stiffness in muscles and joints had a corresponding diagnosis, and only 41.2 % of horses showing lameness had a condition consistent with the observed clinical signs ^[22]. It is therefore possible that in the present study, the owners' reports of reduced mobility were higher than the actual prevalence of disease.

Cardiovascular diseases were reported in 32.7 % of the study population, which was nearly identical to the reported prevalence of gastrointestinal diseases (32.3 %). In contrast, a post-mortem study found cardiovascular diseases to be the cause of death or euthanasia in only 4.8 % of horses over 20 years compared with 40.8 % for gastrointestinal diseases ^[23]. This discrepancy may be explained by the broad definition of circulatory problems in the present study, which owners may have interpreted as general weakness rather than true cardiovascular disease. A lower prevalence was also reported in United States senior horses aged 20 years and older, with only 0.7 % showing veterinary-diagnosed cardiac abnormalities ^[24]. The most common age-related cardiovascular diseases in geriatric horses are degenerative valve disease, aortocardiac fistula and congestive heart failure ^[25].

There are few publications on neurological diseases in geriatric horses. In one study, neurological conditions were listed only as "other" without further detail ^[19]. In contrast to the reported data in the present study post-mortem data indicate that younger horses (15–19 years) were 4.5 times more likely to suffer from neurological conditions than those aged 20 years and older. Common diagnoses included degenerative myelopathy and protozoal myelitis ^[23].

The observed increase in gastrointestinal diseases with age could reflect the influence of various factors, although causal relationships cannot be inferred from the present descriptive data. These include changes in digestion of certain nutrients such as crude protein and phosphorus ^[26], and alterations in the dentition, which as previously discussed can impair mastication ^[16]. Therefore, geriatric horses have specific dietary requirements ^[27]. The information on this topic has been published in a separate article ^[8]. According to another study, the most common causes of colic in horses over 20 years were large colon disease (45 %) and small intestine disease (40 %) ^[10].

As the significance of hearing problems in geriatric horses has not been quantified, they were excluded from the analysis. To enable further analysis of these data, research into hearing disorders in horses of all ages is needed.

Unlike other disease categories, the reported proportion of respiratory diseases was lower in older age groups. These findings contrast with previous studies on geriatric horses, which reported higher proportions of Recurrent Airway Obstruction (RAO) diagnoses in older horses ^[28]. Other studies identified RAO as the most common respiratory condition in older horses ^[9,29]. The reasons for this discrepancy remain unclear, but differing housing conditions may play a role. No significant differences in respiratory parameters were observed between young (2–11 years) and old (≥ 20 years) healthy horses ^[30,31], except for a greater proportion of airway smooth muscle in the inner wall of peripheral airways in older horses ^[32]. Further research is needed to clarify potential age-related effects on respiratory health as the geriatric horse population may be increasing.

Ocular diseases are common in older horses ^[33], with reported prevalence rates as high as 84.0 % and 80.7 % ^[34,35]. In the present study the owner-reported prevalence (28.1 %) was lower, likely because the aforementioned studies focused specifically on ocular diseases. One of the studies reported a significant association between age and ocular disease, with vitreal degeneration and senile retinopathy being the most common ^[35]. Additionally, the importance of early detection of age-related ocular diseases in older horses has been emphasized ^[36].

Vaccination Regimen

Regarding vaccination management, it becomes apparent that the older age groups are highly significantly less likely to be vaccinated against Influenza. This finding is consistent with previous research, in which geriatric horses (20 years or older) were vaccinated significantly less frequently than non-geriatric horses, although the difference was less pronounced than in the present study ^[37].

One possible reason why younger horses are more frequently vaccinated could be that they actively participate in competitions, which often require vaccinations. A similar explanation could apply to horse types, with Warmbloods possibly more likely to be kept as sport horses than ponies. Another possible reason for the age dependence is that owners may not see the necessity to vaccinate older horses, such as those in "retirement groups" with limited movement in or out of the herd. The observed lower vaccination frequency in older horses, based on owner-reported questionnaire data, could be discussed in the context of previous evidence suggesting age-related changes in immune

response, including reduced responsiveness to Influenza vaccination ^[6]. Despite higher baseline levels, older horses show a smaller increase in IgGa and IgGb titres after Influenza vaccination ^[38]. For this reason, targeted vaccination strategies for geriatric horses, including specific vaccines or schedules, may be important. Older horses are also more frequently affected by endocrine or metabolic disorders such as Pituitary Pars Intermedia Dysfunction (PPID) or Equine Metabolic Syndrome (EMS), which can impact immune function ^[6,39,40]. The need for vaccination should therefore be considered according to the individual horse's relative risk of exposure ^[41].

The vaccination rate for EHV also showed a significant decline with increasing age. However, it should be noted that except for the data on Influenza and Rabies, all disease responses were given in free text format.

Anthelmintic treatment

A clear trend can be seen regarding worming strategy. Most horses are wormed several times per year, with about a quarter being selectively wormed.

According to current scientific findings, the modified McMaster method is considered the gold standard in Germany for faecal worm egg count as part of selective worming, with the lowest detection limit generally being 50 EpG (egg count per gram of faeces) ^[42]. The proportion of selectively wormed horses in this study is higher than previously reported, with only 10.9 % of horses being selectively wormed using faecal worm egg counts or tapeworm ELISA testing ^[19]. In this context, it is noteworthy that an analysis revealed an association between horse age and parasite burden: very young and older horses were infected with a higher number of strongylid species, indicating a potential age-related vulnerability that may influence worming strategies ^[43].

Dental Check-ups

That dental check-ups twice a year or more often are more common with older age can likely be explained by the higher prevalence of dental diseases in older horses reported by horse owners, requiring more frequent monitoring.

Within this sample, a difference in proportions was observed between the frequency of dental examinations and the reported occurrence of dental diseases. Horses receiving more frequent dental examinations showed higher proportions of reported dental disease. This pattern may reflect that dental conditions are more likely to be detected in horses that are examined more regularly, or that horses with a history of dental problems are monitored more frequently over time.

This may be of particular clinical relevance, as undetected or insufficiently managed dental disease can have important consequences for overall health and nutrition in older horses. Dental problems or missed dental corrections can lead to poor feed grinding, which for instance can cause impaction colic or choke ^[16]. Undetected and untreated dental diseases also play a major role in the development of weight loss ^[44,45].

Hoof Trimming

The importance of regular hoof care is undisputed. Changes in key parameters related to hoof balance have been shown to occur within 4–6 week shoeing intervals ^[46]. While most geriatric horses are no longer used in high-performance sports, regular hoof care remains essential. Significant age-related differences are evident in the owners' choice of shoeing method: The proportion of shod horses decreases with age, while the use of barefoot management increases. This may indicate that older horses are more lightly worked or less burdened, making shoeing less necessary or that barefoot management is a lower-priced option.

Limitations

The most important limitation of this study is that all health data were based on owner reports without veterinary verification, which may lead to underrecognition and misclassification of diseases ^[47]. Data collected via free text responses had to be categorised for analysis, potentially causing a loss of nuance. Grouping response options for frequency and severity improved ease of evaluation but reduced content depth. In addition, some questionnaire items contained technical terminology or imprecise time references that may have been interpreted differently by participants, introducing information and misclassification bias. The online survey format may have introduced selection bias by underrepresenting owners with limited digital access, and responses covering multiple horses had to be excluded, reducing the sample size. Despite these limitations, this exploratory study provides initial representative data on geriatric horses in Germany, highlighting the need for more focused follow-up research to derive detailed conclusions and practical recommendations, especially regarding the importance of collecting more specific disease-related information.

Conclusions

This questionnaire study based on owner-reported data provides descriptive insights into the management of geriatric horses in Germany. The observed age-related differ-

ences in reported diseases and management practices may indicate the relevance of regular veterinary monitoring and age-adapted care in older horses. The lower vaccination frequency reported for older horses warrants further investigation, particularly in the context of previously described age-related changes in immune response. While the findings may highlight potential areas for owner education and support the need for evidence-based recommendations, interpretations should consider that all information was reported by horse owners and not clinically verified. Given the possibility of a growing population of aged horses and the limited data available, further research using objective clinical assessments is needed to improve understanding of health, management, and quality of life in geriatric horses.

Supplementary Materials:

<https://ffp-ev.de/forschung/abgeschlossenen-projekte/472-ergebnisse-einer-umfrage-ueber-gesundheit-fuetterung-und-haltung-von-alten-pferden-20-jahre>: Online questionnaire.

Funding: This research received no external funding. Institutional Review Board Statement: Because this study did not involve live humans or animals, ethical review and approval were waived. The study was assigned to the internal number P101–23 of the Martin Luther University Halle-Wittenberg.

Statement of informed consent: Participation in this survey was voluntary. All horse owners were informed that the results of the survey would be presented after their participation. Completion of the anonymous questionnaire was considered as consent to participate. No personal data were collected that could identify the participants.

Acknowledgments: The authors have no acknowledgements to declare.

Conflicts of Interest: The authors declare no conflicts of interest.

References

- 1 Anthony DW (1986) The “Kurgan Culture,” Indo-European Origins, and the Domestication of the Horse: A Reconsideration. *Curr Anthropol* 27, 291–313, DOI 10.1086/203441
- 2 Fédération Equestre Nationale (FN) (2024) Jahresbericht 2018 der Deutschen Reiterlichen Vereinigung und des Deutschen Olympiade-Komitee für Reiterei (DOKR).
- 3 Herbst A, Coleman M, Macon E, Harris PA, Adams AA (2023) 122 U.S. Senior Horses: When Are They Considered “Old” and How Does That Affect Their Management? *J Equine Vet Sci* 124, 104424, DOI 10.1016/j.jevs.2023.104424
- 4 Brosnahan MM, Paradis MR (2003) Assessment of Clinical Characteristics, Management Practices, and Activities of Geriatric Horses. *J Am Vet Med Assoc* 223, 99–103, DOI 10.2460/javma.2003.223.99
- 5 De la Fuente M, Miquel J (2009) An Update of the Oxidation-Inflammation Theory of Aging: The Involvement of the Immune System in Oxi-Inflamm-Aging. *Curr Pharm Des* 15, 3003–3026, DOI 10.2174/138161209789058110
- 6 DeNotta S, McFarlane D (2023) Immunosenescence and Inflammaging in the Aged Horse. *Immun Ageing* 20, 2, DOI 10.1186/s12979-022-00325-5
- 7 Coenen M, Kienzle E, Vervuert I, Zeyner A (2011) Recent German Developments in the Formulation of Energy and Nutrient Requirements in Horses and the Resulting Feeding Recommendations. *J Equine Vet Sci* 31, 219–229, DOI 10.1016/j.jevs.2011.03.204
- 8 Czerner AC, Lindner A, Zeyner A, Wensch-Dorendorf M, Gehlen H (2026) Geriatric Horses in Germany: Approaches to Nutrition, Housing and Overall Care. *Animals* 16, 813, DOI 10.3390/ani16050813
- 9 Müller CE, Lindberg JE (2020) Demographics, Body Condition Scores and Feeding of Aged Horses (≥ 20 Years of Age) – A Swedish Survey. *Livest Sci* 223, 103949, DOI 10.1016/j.livsci.2020.103949
- 10 Brosnahan MM, Paradis MR (2003) Demographic and Clinical Characteristics of Geriatric Horses: 467 Cases (1989–1999). *J Am Vet Med Assoc* 223, 93–98, DOI 10.2460/javma.2003.223.93
- 11 Ireland JL, Clegg PD, McGowan CM, McKane SA, Pinchbeck GL (2011) A Cross-Sectional Study of Geriatric Horses in the United Kingdom. Part 1: Demographics and Management Practices. *Equine Vet J* 43, 30–36, DOI 10.1111/j.2042-3306.2010.00145.x
- 12 McGowan TW, Pinchbeck G, Phillips CJC, Perkins N, Hodgson DR, McGowan CM (2010) A Survey of Aged Horses in Queensland, Australia. Part 1: Management and Preventive Health Care. *Aust Vet J* 88, 420–427, DOI 10.1111/j.1751-0813.2010.00637.x
- 13 Traub-Dargatz JL, Long RE, Bertone JJ (2006) What Is an “Old Horse” and Its Recent Impact? In: *Equine Geriatric Medicine and Surgery*; Bertone, J.J., Ed.; WB Saunders: Missouri, pp. 1–4
- 14 Xiong Y, Rozzi R, Zhang Y, Fan L, Zhao J, Li D, Yao Y, Xiao H, Liu J, Zeng X, Xu H, Jiang Y, Lei F (2024) Convergent Evolution Toward a Slow Pace of Life Predisposes Insular Endotherms to Anthropogenic Extinctions. *Sci Adv* 10, eadm8240, DOI 10.1126/sciadv.adm8240
- 15 Gehlen H, Lilje S, Merle R, Steinborn S (2021) Einfluss des Pferdealters auf die Wahl der Haltung, des Managements und der Dienstleistungsansprüche von Pferdebesitzern. *Berl Münch Tierärztl Wschr* 134, 1–7, DOI 10.2376/1439-0299-2020-13
- 16 Immel B, Sinn L (2020) Zahnbehandlung alter Pferde – Was ist anders? *Pferdespiegel* 23, 167–176, DOI 10.1055/a-1251-8214
- 17 Ralston SL, Harris PA (2013) Nutritional Considerations for Aged Horses. In: *Equine Applied and Clinical Nutrition*; Geor, R.J., Harris, P.A., Coenen, M., Eds.; Saunders Elsevier, pp. 289–303, DOI 10.1016/B978-0-7020-3422-0.00015-8
- 18 Du Toit N (2023) Advances in Dental Management in the Equine Geriatric Patient: Strategies for Improved Welfare. *J Am Vet Med Assoc* 261, 114–120, DOI 10.2460/javma.23.06.0350

- 19 Ireland JL, Clegg PD, McGowan CM, McKane SA, Pinchbeck GL (2011) A Cross-Sectional Study of Geriatric Horses in the United Kingdom. Part 2: Health Care and Disease. *Equine Vet J* 43, 37–44, DOI 10.1111/j.2042-3306.2010.00142.x
- 20 Yunus MHY, Nordin A, Kamal H (2020) Pathophysiological Perspective of Osteoarthritis. *Medicina* 56, 614, DOI 10.3390/medicina56110614
- 21 Loeser RF, Collins JA, Diekman BO (2016) Ageing and the Pathogenesis of Osteoarthritis. *Nat Rev Rheumatol* 12, 412–420, DOI 10.1038/nrrheum.2016.65
- 22 McGowan TW, Pinchbeck G, Phillips CJC, Perkins N, Hodgson DR, McGowan CM (2010) A Survey of Aged Horses in Queensland, Australia. Part 2: Clinical Signs and Owners' Perceptions of Health and Welfare. *Aust Vet J* 88, 465–471, DOI 10.1111/j.1751-0813.2010.00638.x
- 23 Miller MA, Moore GE, Bertin FR, Kritchevsky JE (2016) What's New in Old Horses? Postmortem Diagnoses in Mature and Aged Equids. *Vet Pathol* 53, 390–398, DOI 10.1177/0300985815608674
- 24 Herbst AC, Coleman MC, Macon EL, Harris PA, Adams AA (2025) Owner-Reported Health and Disease in U.S. Senior Horses. *Equine Vet J* 57, 684–702, DOI 10.1111/evj.14200
- 25 Sage AM (2002) Cardiac Disease in the Geriatric Horse. *Vet Clin North Am Equine Pract* 18, 575–589, DOI 10.1016/s0749-0739(02)00023-8
- 26 Ralston SL, Squires EL, Nockels CF (1989) Digestion in the Aged Horse. *Proc 10th Equine Nutr Physiol Symp* 9, 203–205, DOI 10.1016/S0737-0806(89)80052-8
- 27 Ralston SL (1990) Clinical Nutrition of Adult Horses. *Vet Clin North Am Equine Pract* 6, 339–354, DOI 10.1016/S0749-0739(17)30545-X
- 28 Hotchkiss JW, Reid SWJ, Christley RM (2007) A Survey of Horse Owners in Great Britain Regarding Horses in Their Care. Part 2: Risk Factors for Recurrent Airway Obstruction. *Equine Vet J* 39, 301–308, DOI 10.2746/042516407X180129
- 29 Ireland JL, Clegg PD, McGowan CM, McKane SA, Chandler KJ, Pinchbeck GL (2012) Disease Prevalence in Geriatric Horses in the United Kingdom: Veterinary Clinical Assessment of 200 Cases. *Equine Vet J* 44, 101–106, DOI 10.1111/j.2042-3306.2010.00361.x
- 30 Lugo J, Harkema JR, deFeijter-Rupp H, Bartner L, Boruta D, Robinson NE (2006) Airway Inflammation Is Associated with Mucous Cell Metaplasia and Increased Intraepithelial Stored Mucosubstances in Horses. *Vet J* 172, 293–301, DOI 10.1016/j.tvjl.2005.04.018
- 31 Pacheco AP, Paradis MR, Hoffmann AM, Hermida P, Sanchez A, Nadeau JA, Tufts M, Mazan MR (2014) Age Effects on Blood Gas, Spirometry, Airway Reactivity, and Bronchoalveolar Lavage Fluid Cytology in Clinically Healthy Horses. *J Vet Intern Med* 28, 603–608, DOI 10.1111/jvim.12318
- 32 Bullone M, Pouyet M, Lavoie JP (2017) Age Associated Changes in Peripheral Airway Smooth Muscle Mass of Healthy Horses. *Vet J* 226, 62–64, DOI 10.1016/j.tvjl.2017.07.007
- 33 Malalana F (2016) Ophthalmologic Disorders in Aged Horses. *Vet Clin North Am Equine Pract* 32, 249–261, DOI 10.1016/j.cveq.2016.04.004
- 34 Chalder R, Housby-Skeggs N, Clark C, Pollard D, Hartley C, Blacklock B (2024) Ocular Findings in a Population of Geriatric Equids in the United Kingdom. *Equine Vet J* 56, 121–130, DOI 10.1111/evj.13941
- 35 Chandler KJ, Billson FM, Mellor DJ (2003) Ophthalmic Lesions in 83 Geriatric Horses and Ponies. *Vet Rec* 153, 319–322, DOI 10.1136/vr.153.11.319
- 36 Cutler TJ (2002) Ophthalmic Findings in the Geriatric Horse. *Vet Clin North Am Equine Pract* 18, 545–574, DOI 10.1016/s0749-0739(02)00037-8
- 37 Mueller MK, Sween C, Frank N, Paradis MR (2018) Survey of Human-Horse Relationships and Veterinary Care for Geriatric Horses. *J Am Vet Med Assoc* 253, 337–345, DOI 10.2460/javma.253.3.337
- 38 Muirhead TL, McClure JC, Wichtel JJ, Stryhn H, Frederick Markham RJ, McFarlane D, Lunn DP (2008) The Effect of Age on Serum Antibody Titers after Rabies and Influenza Vaccination in Healthy Horses. *J Vet Intern Med* 22, 654–661, DOI 10.1111/j.1939-1676.2008.0091.x
- 39 Zak A, Siwinska N, Elzinga S, Barker VD, Stefaniak T, Schanbacher BJ, Place NJ, Niedzwiedz A, Adams AA (2020) Effects of Advanced Age and Pituitary Pars Intermedia Dysfunction on Components of the Acute Phase Reaction in Horses. *Domest Anim Endocrinol* 72, 106476, DOI 10.1016/j.domaniend.2020.106476
- 40 McFarlane D, Holbrook TC (2008) Cytokine Dysregulation in Aged Horses and Horses with Pituitary Pars Intermedia Dysfunction. *J Vet Intern Med* 22, 436–442, DOI 10.1111/j.1939-1676.2008.0076.x
- 41 Fermaglich DH, Horohov DW (2002) The Effect of Aging on Immune Responses. *Vet Clin North Am Equine Pract* 18, 621–630, DOI 10.1016/S0749-0739(02)00027-5
- 42 Schieder AK (2019) Parasitenmanagement beim Pferd – Was ändert sich? *Pferdespiegel* 22, 126–136, DOI 10.1055/s-0037-1599618
- 43 Kuzmina TA, Dzeverin I, Kharchenko VA (2016) Strongylids in Domestic Horses: Influence of Horse Age, Breed and Deworming Programs on the Strongyle Parasite Community. *Vet Parasitol* 227, 56–63, DOI 10.1016/j.vetpar.2016.07.024
- 44 Dickinson CE, Lori DN (2002) Diagnostic Workup for Weight Loss in the Geriatric Horse. *Vet Clin North Am Equine Pract* 18, 523–531, DOI 10.1016/s0749-0739(02)00036-6
- 45 Jarvis NG (2009) Nutrition of the Aged Horse. *Vet Clin North Am Equine Pract* 25, 155–166, DOI 10.1016/j.cveq.2009.01.003
- 46 Lesniak K, Williams J, Kuznik K, Douglas P (2017) Does a 4–6 Week Shoeing Interval Promote Optimal Foot Balance in the Working Equine? *Animals* 7, 29, DOI 10.3390/ani7040029
- 47 Ireland JL, Clegg PD, McGowan CM, McKane SA, Chandler KJ, Pinchbeck GL (2012) Comparison of Owner-Reported Health Problems with Veterinary Assessment of Geriatric Horses in the United Kingdom. *Equine Vet J* 44, 94–100, DOI 10.1111/j.2042-3306.2011.00394.x

Erweiterte Zusammenfassung

Geriatrische Pferdepopulation in Deutschland – Einblicke in Gesundheit und Management

In den letzten Jahrzehnten scheint ein zunehmender Anteil der Hauspferde in Deutschland ein fortgeschrittenes Alter zu erreichen. Wissenschaftliche Populationsdaten zum Gesundheitszustand und zur Haltung und Versorgung älterer Pferde sind jedoch weiterhin begrenzt. Um diese Forschungslücken zu schließen, zielte diese rein beschreibende Querschnittsstudie darauf ab, die von den Pferdehaltern wahrgenom-

menen Gesundheitszustände, das gleichzeitige Auftreten mehrerer Erkrankungen sowie die Routinen der gesundheitlichen Versorgung bei Pferden im Alter von 20 Jahren und älter in Deutschland zu charakterisieren. Da sämtliche Daten ausschließlich auf Angaben aus Fragebögen der Pferdehalter beruhen und keine objektive klinische Überprüfung erfolgte, bestand das Ziel ausdrücklich darin, beschreibende Einblicke in die Beobachtungen der Pferdehalter und die von ihnen angegebenen Versorgungspraktiken über verschiedene Altersgruppen, Pferdetypen und Geschlechter hinweg zu gewinnen. Ziel war es hingegen nicht, klinisch bestätigte Häufigkeiten von Erkrankungen oder ursächliche Zusammenhänge festzustellen.

Die Daten wurden mittels einer explorativen Online-Umfrage erhoben, die mithilfe der Software easyfeedback durchgeführt wurde und für Pferdehalterinnen und Pferdehalter über die Website des Vereins zur Förderung der Forschung im Pferdesport e.V. (FFP) im Zeitraum vom 5. April bis zum 15. Juni 2023 zugänglich war. Von den insgesamt 1541 vollständig ausgefüllten Fragebögen wurden Angaben zu mehreren Pferden ausgeschlossen, um die Vergleichbarkeit der Fälle sicherzustellen, sodass 923 Fragebögen mit Angaben zu jeweils einem einzelnen Pferd verblieben. Insgesamt erfüllten 919 Pferde im Alter von 20 bis 39 Jahren (mittleres Alter $25,74 \pm 3,96$ Jahre) alle Kriterien für eine nach Altersgruppen stratifizierte deskriptive Auswertung. Die Pferde wurden anhand des angegebenen Alters in drei Altersintervalle eingeteilt: 20–24 Jahre (Altersgruppe 1, 42,2 %, $n = 388$), 25–29 Jahre (Altersgruppe 2, 38,1 %, $n = 350$) und ≥ 30 Jahre (Altersgruppe 3, 19,7 %, $n = 181$) (Abbildung 1). Auf Grundlage der von den Halterinnen und Haltern angegebenen Rassen wurden die Pferde in vier Stoffwechseltyp-Gruppen eingeteilt: Warmblüter (57,6 %, $n = 530$), Ponys und Kleinpferderassen (24,9 %, $n = 230$), Vollblüter und Vollblut-Mischlinge (9,6 %, $n = 88$) sowie Sonstige (7,8 %, $n = 72$) (Abbildung 2, Tabelle 1). Der Fragebogen umfasste 25 Fragen, mit denen subjektive Einschätzungen der Halterinnen und Halter zum Gesundheitszustand nach Organsystemen sowie zur Entwurmung, Impfung, Zahngesundheit und Hufpflege erhoben wurden. Die statistische Auswertung erfolgte mit SAS Studio. Aufgrund des explorativen und nicht-konfirmatorischen Charakters der Umfrage beschränkte sich die Analyse auf deskriptive Zusammenfassungen (Anzahlen, Prozentsätze, Mittelwert $\pm$ Standardabweichung) sowie deskriptive Gruppenvergleiche anhand von Odds Ratios (OR) mit 95%-Konfidenzintervallen (95%-KI). Formale Korrekturen für multiple Vergleiche wurden nicht vorgenommen und kausale Zusammenhänge wurden nicht abgeleitet.

Alle Ergebnisse stellen von den Besitzern berichtete Beobachtungen dar und nicht klinisch diagnostizierte Erkrankungen. Insgesamt wurden von den Besitzern am häufigsten orthopädische Erkrankungen (66,7 %, $n = 580$), eingeschränkte Mobilität (65,9 %, $n = 602$), Zahnerkrankungen (57,2 %, $n = 497$), Hauterkrankungen (35,9 %, $n = 289$), Herz-Kreislauf-Erkrankungen (32,7 %, $n = 255$), Erkrankungen des Magen-Darm-Trakts (32,3 %, $n = 257$), neurologische Erkrankungen (31,1 %, $n = 237$), Atemwegserkrankungen (28,5 %, $n = 233$), Augenerkrankungen (28,1 %, $n = 223$), Infektionskrankheiten (21,2 %, $n = 183$) sowie Hörprobleme (18,1 %, $n = 133$) angegeben (Tabelle 2). Eine von den Besitzern berichtete Komorbidität (definiert als das gleichzeitige Vorliegen von drei oder mehr Erkrankungen) wurde bei 68,2 % der Pferde ($n = 629$) festgestellt und zeigte eine deskriptive Zunahme in höheren Altersgruppen ($p < 0,001$), wobei sie bei Pferden, die laut Angaben der Besitzer ≥ 30 Jahre alt waren, 80,0 % erreichte (Tabelle 2). Besitzer von Pferden im Alter von 20–24 Jahren berichteten im Vergleich zu Besitzern von Pferden im Alter von 25–29 Jahren (OR = 0,53, 95%-KI [0,36–0,76]) und ≥ 30 Jahren (OR = 0,36, 95%-KI [0,22–0,60]) über eine geringere Wahrscheinlichkeit für das Vorliegen einer Komorbidität (Tabelle 2). Deskriptive altersabhängige Zunahmen in den Angaben der Besitzer wurden außerdem für eingeschränkte Mobilität ($p < 0,001$), Zahnerkrankungen ($p < 0,001$), Erkrankungen des Magen-Darm-Trakts ($p = 0,023$), Hörprobleme ($p < 0,001$), Herz-Kreislauf-Probleme ($p < 0,001$) und neurologische Auffälligkeiten ($p < 0,001$) festgestellt (Tabelle 2), wobei durchgängig ein signifikanter Unterschied zwischen den Altersgruppen eins und zwei und in einigen Fällen zusätzlich zwischen den Gruppen zwei und drei beobachtet wurde. Im Gegensatz dazu war der Anteil der von den Besitzern berichteten Atemwegserkrankungen in der Altersgruppe drei niedriger als in der Altersgruppe eins ($p = 0,012$; Tabelle 2). Für die berichteten orthopädischen Erkrankungen, Hauterkrankungen oder Infektionskrankheiten wurden keine deskriptiven altersabhängigen Trends beobachtet.

Auch hinsichtlich des von den Besitzern angegebenen Geschlechts und Typs der Pferde wurden Unterschiede festgestellt. Bei Stuten wurden höhere Anteile orthopädischer Erkrankungen (OR = 1,37, $p = 0,032$) und Augenerkrankungen (OR = 1,41, $p = 0,032$), jedoch niedrigere Anteile an Zahnerkrankungen (OR = 0,64, $p = 0,001$) und Magen-Darm-Erkrankungen (OR = 0,71, $p = 0,029$) als bei Wallachen/Hengsten berichtet. Besitzer von Warmblütern (OR = 0,53, $p = 0,012$) und Ponys/Kleinpferderassen (OR = 0,53, $p = 0,021$) berichteten über niedrigere Raten an Zahnerkrankungen als Besitzer von Vollblütern/Partbreds. Besitzer von Warmblütern berichteten häufiger über Hauterkrankungen (OR = 1,51, $p = 0,022$) und Hörprobleme (OR = 2,30, $p = 0,001$) als Ponybesitzer.

Hinsichtlich der von den Besitzern beschriebenen Gesundheitsvorsorge verfügten 85,0 % der Studienpopulation ($n = 783$) über einen allgemeinen Impfstatus. Die berichtete Impfdeckung gegen die Equine Influenza (46,0 % jährlich, 11,8 % halbjährlich, 42,2 % ungeimpft) und das Equine Herpesvirus (18,0 %) war jedoch in den Altersgruppen zwei und drei niedriger als in der Altersgruppe eins (Tabelle 3, Tabelle 4): Eine Influenza-Impfung wurde bei Pferden im Alter von 20–24 Jahren häufiger berichtet als bei Pferden im Alter von 25–29 Jahren (OR = 1,55, $p < 0,001$) und ≥ 30 Jahren (OR = 2,27, $p < 0,001$; Tabelle 4). Besitzer von Warmblütern berichteten über höhere Impfraten gegen Influenza (OR = 1,68, $p = 0,001$) und EHV (OR = 1,70, $p = 0,017$) als Ponybesitzer. Die Behandlung gegen Endoparasiten wurde von 69,1 % ($n = 637$) der Besitzer als mehrmals jährlich durchgeführt beschrieben, während 25,4 % ($n = 234$) eine selektive Entwurmung und 5,5 % ($n = 51$) eine jährliche Behandlung angaben. Bei 71,2 % ($n = 653$) der Pferde wurden jährliche zahnmedizinische Untersuchungen berichtet, während 16,0 % ($n = 147$) zweimal jährlich oder häufiger untersucht wurden.

Bei 89,3 % der Studienpopulation ($n = 818$) wurde ein Ausschneiden bzw. Beschlagen der Hufe alle 6–8 Wochen angegeben, überwiegend durch qualifizierte Hufschmiede (75,0 %, $n = 659$) (Tabelle 5). Eine Barhufhaltung (47,4 %, $n = 436$) wurde in der Studienpopulation der Pferde ab einem Alter von 20 Jahren häufiger berichtet als eine Haltung mit zwei Hufeisen (20,6 %, $n = 189$) oder vier Hufeisen (18,9 %, $n = 174$) (Tabelle 5).

Da diese Studie ausschließlich auf nicht verifizierten, von den Besitzern angegebenen Fragebogendaten basiert, müssen die Ergebnisse strikt als deskriptive Darstellung der Wahrnehmungen, Erfahrungen und berichteten Handlungs- und Managementpraktiken der Besitzer interpretiert werden und nicht als bestätigte veterinärmedizinische Daten. Die deskriptiven Trends weisen auf potenzielle Wissenslücken bei den Besitzern hin, insbesondere im Hinblick auf altersbedingte Komorbiditäten und die abnehmende Impfdeckung bei älteren Pferden. Um die inhärenten Einschränkungen von Angaben der Besitzer zu überwinden, sind zukünftige Studien unter Einbeziehung objektiver tierärztlicher klinischer Untersuchungen unerlässlich, um diese Ergebnisse zu validieren und evidenzbasierte Standards für das Wohlergehen geriatrischer Pferde zu etablieren.

Schlüsselwörter: Pferd, Erkrankung, Alterung, Umfrage, Impfung, Entwurmung