DOI: http://dx.doi.org/10.22201/fmvz.24486760e.2023.1083
Vol. 10 | 2023

Veterinaria México OA
Publicación Digital de la Facultad de Medicina Veterinaria y Zootecnia https://veterinariamexico.fmvz.unam.mx/

Identity and frequency of non-traditional companion animals presented at a university teaching hospital: a retrospective study (2009–2019)

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Abstract

This study describes the diversity of the species received for medical evaluation at the Exotic Pet and Wildlife Teaching Hospital in Mexico; identifying the most common non-traditional companion animals owned, the frequency of the species received along the years, and which of those correspond to native Mexican wildlife. This retrospective descriptive study comprised 8 619 patient records from 2009 to 2019. During the period analyzed, 129 species were identified, 60 of these being native Mexican wildlife. Most of the patients received were mammals (56.36 %) followed by reptiles (38.73 %), and 4.91 % remaining were composed by birds, amphibian, fish and invertebrate species. Eight species contributed to the highest percentage of the records (79.88 %), being the red-eared slider (*Trachemys scripta elegans*) the most common (18.71 %). The number of annual records varied through the period with a trend for increased demand recently. It was possible to identify changes in the frequency of visits of different species over the study period, which allowed us to determine that the preference for the maintenance of some species in captivity has decreased. Commonly received species identification allows veterinary medicine students to specialize and develop the required species-specific medical competencies.

Keywords: Non-traditional companion animals; Frequency; Wildlife; Consultation; Veterinary medicine.

Submitted: 2022-06-01
Accepted: 2023-02-16
Published: 2023-03-14

Additional information and declarations can be found on page 14

Cite this as:

Ángeles-Torres LE, Ducoing-Watty AM, Silva-Castillo RO, Villavicencio-Oropeza A, Maldonado-Reséndiz RI. dentity and frequency of non-traditional companion animals presented at a university teaching hospital: a retrospective study (2009–2019). Veterinaria México OA. 2023;10. doi: 10.22201/fmvz.24486760e.2023.1083.

DOI: http://dx.doi.org/10.22201/fmvz.24486760e.2023.1083
Vol. 10 | 2023

Study contribution

Non-conventional pets have become quite common in homes recently; however, there is no list of the species that are received in the consultation, much less of the frequency or the percentage that each one of them represents. This study reports the total number of species received in medical practice at a teaching hospital in Mexico City, which are the most common, their variation over the years, and their variation by season of the year. This allows us to identify the areas of knowledge that must be strengthened during the career, as well as the skills to be developed. It allows us to know the diversity of species kept as companion animals, and to compare it to that of one of the other countries.

Introduction

The Exotic Pet and Wildlife Teaching Hospital (UNAM-EPWTH) of the Facultad de Medicina Veterinaria y Zootecnia – Universidad Nacional Autónoma de México (FMVZ-UNAM) works as a teaching hospital dedicated to medical assistance, teaching, and research. It was created in response to the need for medical care of the wildlife and non-traditional companion animals that inhabit the city or are kept in captivity. Mexico has about 548 mammal species, 1 123 birds, 361 amphibians, and about 804 reptiles.[1,3] However, to date, it is unknown how many species are kept as companion animals, as it is their legal original status.

The British Small Animal Veterinary Association (BSAVA) defined non-traditional companion animals as "those animals that are not traditionally domesticated or kept as pets and whose welfare need can be more difficult to meet in a domestic environment".[4] Some people consider that small species such as reptiles do not have the same attention needs as a dog or cat, a characteristic that fits their busy lives and the little time that they have.[5] With a large list available on the market, the possibility opens up for new species to be kept as companion animals. This creates the need to generate new species-specific veterinary services. Pet maintenance and its market are constantly growing, including the non-traditional companion animal market; in 2014, 26 % of the population reported that they had a pet. By 2021, 69.8 % of the population had a companion animal at home.[6,7] In Mexico, population censuses that conducted by the government to determine if homes have any companion animals, are limited to knowing if it is a dog or a cat, other species are registered as "other kind of pets".[6]

Published reports concerning the non-traditional companion animals' caseload in university teaching veterinary hospitals are scarce and mainly presented as undergraduate thesis, so the access to the information may be limited. Martin[8] published a study from 2004–2015 with data patients of the Clinic for Zoo Animals, Exotic Pets and Wildlife of the University of Zurich, and previously, Hernández[9] published another one with patient data of the UNAM-EPWTH from 2005–2010, both evaluating the casuistry, and determining which pathologies the individuals received in consultation presented and their frequency. In contrast, this study generated a list of species received for veterinary evaluation at UNAM-EPWTH, to identify which are the most popular as pets, and to evaluate the annual evolution thereof. As the UNAM-EPWTH is a teaching hospital, this data can also be used to update the curricular content of the career and to identify the potential areas for continuing education opportunities or professional development for veterinarians in clinical practice.

DOI: http://dx.doi.org/10.22201/fmvz.24486760e.2023.1083
Vol. 10 | 2023

Materials and methods

For the purposes of this work, a "non-traditional companion animal" was considered an animal that is not a dog or cat that is kept as a companion animal.

Data

Records from exotic pets and wildlife received at the UNAM-EPWTH between January 2009 and December 2019 were reviewed. Medical records of all patients brought for an initial medical examination or that came for medical follow-ups were evaluated, including their photographic records.

Criteria for data selection

For each record, the species' scientific name, origin (captive bred, wild caught), the date, and type of visit (initial medical examination/follow-up) were obtained. In some cases, the origin of the specimen is assumed depending on the species presented, for example, turtles of the genus *Kinosternon* were assumed as wild caught because it is complicated to breed in captivity and no permissions are awarded for their legal maintenance. When the species was not included in the patient's file or the information was doubted, the photographic record and taxonomic guides were used for identification. Records in which the genus could not be corroborated, and there was no photographic evidence of the clinical session, were excluded from the analysis. The species were classified under risk categories (not evaluated, data deficient, least concern, neat threatened, vulnerable, endangered, critically endangered, extinct in the wild, extinct) according to the criteria of the International Union for the Conservation of Nature (IUCN).[10]

A total of 8 619 medical records were reviewed; in 8 330, it was possible to identify the species, date, and type of visit to the hospital (initial medical examination/medical follow-up). In 196 records, only the genus could be confirmed; no more information was recorded, and the photographic record did not provide specific anatomical details for identification. Ninety-three records do not meet the inclusion criteria and were excluded. The number of different species and groups received was established, and the most frequent ones were identified.

Statistical analysis

The total number of initial medical examination visits and follow-ups annually were established, and the total annual caseload growth or decrease was calculated by obtaining the difference of consultations received between two consecutive years and dividing between the received in the previous year. The most frequent species were defined as the eight species whose values represented the highest percentage of the patients received 79.88% (more than 100 records in the 11 years).

The proportion of presentation for these eight species was compared over the years by the same method for annual growth or decrease, and from between seasons (spring from March 20th to June 21st, summer from June 21st to September 23rd, fall from September 23rd to December 21st and winter from December 21st to March 21st) using the χ^2 test. The Bonferroni correction was applied since many

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Vol. 10 | 2023

comparisons were made, and statistical significance was set at $P < 0.05$. Data were analyzed using SPSS Statistics (IBM, Armonk, NY).[11]

Results

Lists of species

Between 2009 and 2019, 129 different species were presented to UNAM-EPWTH and were classified into six groups: mammals, reptiles, birds, amphibians, fish, and invertebrates. Each year, new species that were not registered were received in consultation; in 2009 were reported 36 and in 2019 were received 63 more species, most of these could be revised in subsequent years such as the rabbit or the red-eared slider or not be reported again such as the caracal. Twenty-seven species represented the mammals, forty-seven for reptiles, thirty-five for birds, ten for amphibians, four fish species, and six invertebrate species (Table 1).

Most of the species presented could be considered common in the market of non-traditional companion animals; however, some species stand out from the others, for example, mammals such as the spider monkey (*Ateles geoffroyi*), the jaguar (*Panthera onca*), and the ocelot (*Leopardus pardalis*) have been reported. Additionally, three specimens of the swamp crocodile (*Crocodylus moreletii*) for reptiles and for invertebrates, three species of Mexican tarantulas (*Brachypelma albiceps*, *B. auratum* and *B. smithi*) were reported. Sixty species were reported to be native Mexican wildlife, 36 of which were classified under some risk category.

Frequencies

Between January 2009 to December 2019, the UNAM-EPWTH performed 8 526 medical examinations, of which 50.5 % (n = 4 306) were first-time patients and 49.5 % (n = 4 220) revisions for follow-up (Figure 1A). The highest percentage (56.36 %, n = 2 427), of initial medical examinations represented by mammals and the second place by reptiles (38.73 %, n = 1 668). These two groups combined account for 95.09 % of all clinical sessions. The rest of the groups were represented with the following frequencies: birds 3.18 % (n = 137), amphibians 0.83 % (n = 36), fish 0.62 % (n = 27), and invertebrates 0.25 % (n = 11).

The mammal received in higher proportion (30.73 %, n = 746) was the rabbit (*O. cuniculus*). The red-eared slider (*T. scripta elegans*) was the most received reptile (48.32 % n = 806). Alternatively, the yellow-cheeked parrot (*Amazona autumnalis*) was the most consultations' bird (19.70 %, n = 27). In the group of amphibians, Mexican axolotl (*Ambystoma mexicanum*) represented the highest percentage (47.22 %, n = 17). Siamese fighting fish (*Betta splendens*) was the fish (55.55 %, n = 15) with more consultations. Within the invertebrates, red-knee tarantula (*Brachypelma smithi*) and emperor scorpion (*Pandinus imperator*) shared the first place with 27.27 % (n = 3).

Regardless of the group, eight species were identified as the most frequently examined during the 11 years (Figure 1B).

DOI: http://dx.doi.org/10.22201/fmvz.24486760e.2023.1083
Vol. 10 | 2023

Table 1. Species frequency (%) received at the HVE-FSEC (2009 to 2019)

Scientific name	Cases	%	Scientific name	Cases	%	Scientific name	Cases	%
Mammals			*Otospermophilus variegatus**†	1	0.04	*Thamnophis* spp.*‡	5	0.29
Oryctolagus cuniculus	746	30.73	*Potos flavus**†	1	0.04	*Barisia imbricata**†	4	0.23
Cavia porcellus	624	25.71	**Total**	**2427**	**100**	*Graptemys geographica*†	4	0.23
Mustela putorius furo	352	14.5	**Reptiles**			*Podocnemys unifilis*	4	0.23
Atelerix albiventris†	323	13.3	*Trachemys scripta elegans**†	806	48.32	*Pseudemys* spp.*†	4	0.23
Mesocricetus auratus§	104	4.28	*Iguana iguana**†	383	22.96	*Chamaeleo jacksonii*†	3	0.17
Mus musculus	50	2.06	*Kinosternon* spp.*	103	6.17	*Crocodylus moreletii**†	3	0.17
Rattus norvegicus	50	2.06	*Python regius*†	47	2.81	*Lampropeltis getula**†	3	0.17
Chinchilla lanigera	45	1.85	*Trachemys venusta**	44	2.63	*Pituophis deppei**†	3	0.17
Sus scrofa scrofa	28	1.15	*Gopherus* spp.*†	37	2.21	*Staurotypus triporcatus**‡	3	0.17
Meriones unguiculatus†	17	0.7	*Chamaeleo calyptratus*†	24	1.43	*Morelia viridis*†	2	0.11
*Sciurus aureogaster**†	16	0.65	*Rhinoclemmys* spp.*‡	21	1.25	*Oxyrhopus rhombifer*†	2	0.11
*Didelphis virginiana**†	15	0.49	*Boa constrictor**†	19	1.13	*Varanus exanthematicus*†	2	0.11
Cricetulus barabensis†	12	0.49	*Centrochelys sulcata*‖	14	0.83	*Chelonoidis denticulata*§	1	0.05
Phodopus spp.	11	0.45	*Pogona vitticeps*†	14	0.83	*Chelydra rossignonii**§	1	0.05
Petaurus breviceps†	9	0.37	*Chelonoidis carbonaria*	13	0.77	*Crotalus polystictus**†	1	0.05
*Ateles geoffroyi**‖	4	0.16	*Eublepharis macularius*†	13	0.77	*Epicrates cenchria*†	1	0.05
Ovis aries	4	0.16	*Stigmochelys pardalis*†	13	0.77	*Gekko gecko*†	1	0.05
Saimiri sciureus†	4	0.16	*Ctenosaura pectinata**†	12	0.71	*Hemitheconyx caudicinctus*†	1	0.05
*Procyon lotor**†	3	0.12	*Apalone spinifera**†	10	0.59	*Laemanctus serratus**†	1	0.05
Capra hircus	2	0.08	*Graptemys pseudogreographica*†	10	0.59	*Lampropeltis polyzona**†	1	0.05
*Panthera onca**‡	2	0.08	*Python bivittatus*§	9	0.53	*Malayopython reticulatus*†	1	0.05
Callithrix penicillata†	1	0.04	*Phrynosoma orbiculare**†	6	0.35	*Opheodrys aestivus**†	1	0.05
Caracal caracal†	1	0.04	*Trachemys scripta scripta**†	6	0.35	*Sceloporus* spp.*†	1	0.05
Cebuella pygmaea§	1	0.04	*Chelydra serpentina**†	5	0.29	*Varanus panoptes*†	1	0.05
*Leopardus pardalis**†	1	0.04	*Pantherophis guttatus*†	5	0.29	**Total**	**1668**	**100**

*Native Mexican wildlife †Least Concern ‡Near Threatened §Vulnerable ‖Endangered ¶Critical Endangered

DOI: http://dx.doi.org/10.22201/fmvz.24486760e.2023.1083
Vol. 10 | 2023

Continuation….

Scientific name	Cases	%	Scientific name	Cases	%	Scientific name	Cases	%
Birds			*Parabuteo unicinctus**†	2	1.5	*Agalychnis callidryas**†	2	5.55
*Amazona autumnalis**†	27	19.7	*Sturnus vulgaris*†	2	1.5	*Rhinella marina*†	2	5.55
Melopsittacus undulatus†	13	9.48	*Thectocercus acuticaudatus*	2	1.5	*Xenopus laevis*†	2	5.55
*Amazona oratrix**‖	10	7.29	*Amazona auropalliata**¶	1	0.7	*Tripion spatulatus**	1	2.77
Myopsitta monachus	9	6.56	*Amazona ochrocephala*†	1	0.7	*Smilisca baudinii**†	1	2.77
Serinus canaria†	8	5.83	*Aratinga solstitialis*‖	1	0.7	*Dryophytes cinereus*†	1	2.77
Agaporni spp.†	7	5.1	*Cacatua sulphurea*¶	1	0.7	**Total**	**36**	**100**
*Amazona albifrons**†	6	4.37	*Columbina inca**†	1	0.7	**Fish**		
Aratinga spp.*	5	3.64	*Deroptyus accipitrinus*†	1	0.7	*Betta splendens*§	15	55.55
*Ara macao**†	4	2.91	*Eolophus roseicapilla*†	1	0.7	*Carassius auratus*†	8	29.62
Nymphicus hollandicus†	4	2.91	*Eupherusa* spp.*	1	0.7	*Ciprinus carpio*	2	7.4
*Amazona finschi**‖	3	2.18	*Falco sparverius**†	1	0.7	*Trichogaster microlepis*	2	7.4
Ara ararauna†	3	2.18	*Florisuga mellivora**†	1	0.7	**Total**	**27**	**100**
Columba livia†	3	2.18	*Gallus gallus*	1	0.7	**Invertebrates**		
*Coragyps atratus**†	3	2.18	*Micrathene whitneyi**†	1	0.7	*Brachypelma smithi**‡	3	27.27
*Eupsittula canicularis**§	3	2.18	**Total**	**137**	**100**	*Pandinus imperator*	3	27.27
Psittacus erithacus‖	3	2.18	**Amphibians**			*Brachypelma auratum**‡	2	18.18
*Amazona viridigenalis**‖	2	1.45	*Ambystoma mexicanum**¶	17	47	*Brachypelma albiceps**†	1	9.09
Anser anser†	2	1.45	*Agalychnis dacnicolor**†	4	11	*Grammostola rosea*	1	9.09
*Athene cunicularia**†	2	1.45	*Ceratophrys cranwelli*†	3	8.3	*Coenobita* spp.*	1	9.09
*Bubo virginianus**†	2	1.45	*Lithobates catesbeianus*	3	8.3	**Total**	**11**	**100**

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DOI: http://dx.doi.org/10.22201/fmvz.24486760e.2023.1083
Vol. 10 | 2023

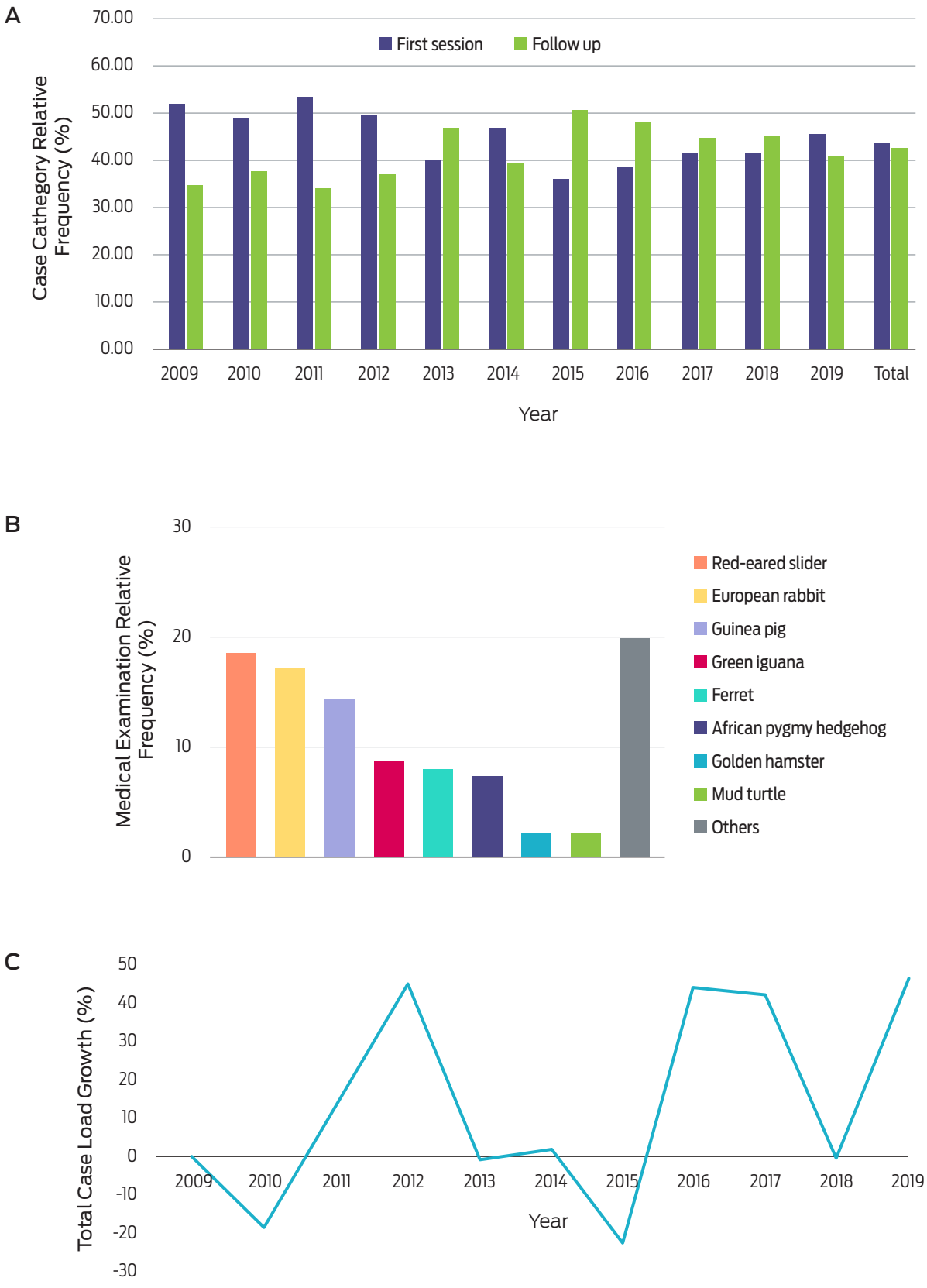

Figure 1. A) case distribution, divided into initial and follow-ups. B) relative medical examination frequency for the 8 most common species received at HVE-FSEC between 2009 and 2019. C) total caseload growth and decrease per year, in comparison to the previous one.

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Vol. 10 | 2023

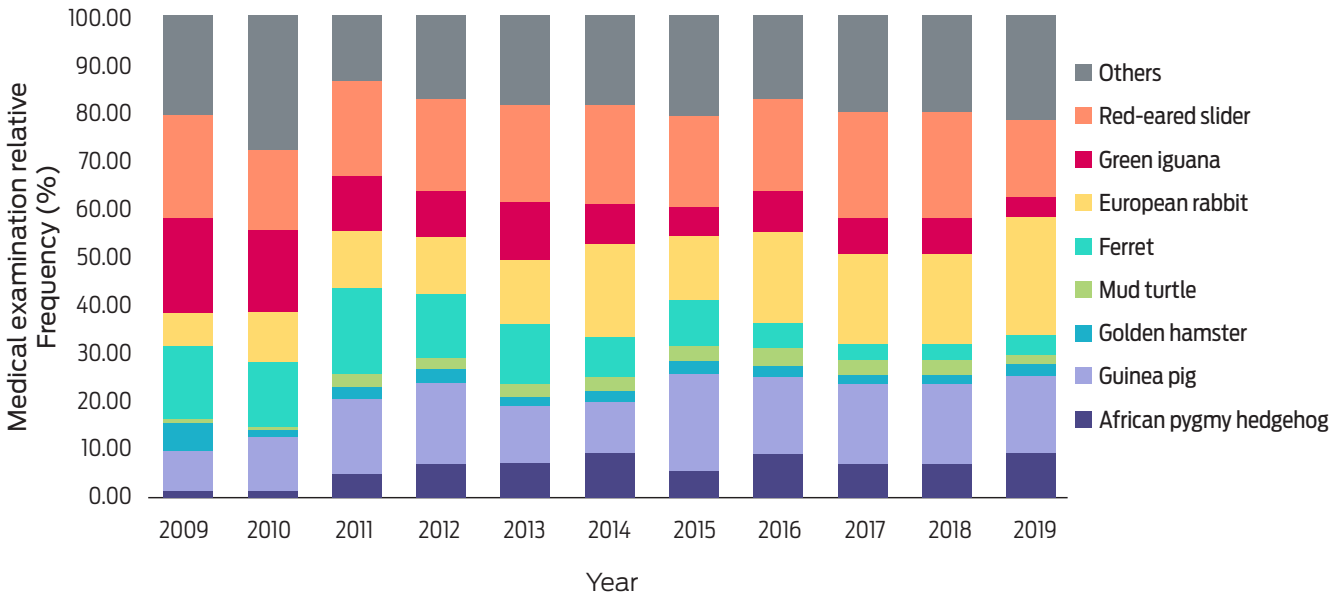

Figure 2. Relative medical examination frequency for the 8 most common species received at HVE-FSEC between 2009 and 2019.

The most frequent were the red-eared sliders (*T. scripta elegans*, 18.71 %, n = 806), followed by rabbits (*O. cuniculus*, 17.32 % n = 746), guinea pigs (*Cavia porcellus*, 14.49 % n = 624), green iguanas (*Iguana iguana*, 8.89 % n = 383), ferrets (*Mustela putorius furo*, 8.17 % n = 352), African pygmy hedgehogs (*Atelerix albiventris*, 7.50 % n = 323), golden hamsters (*Mesocricetus auratus*, 2.41 % n = 104), and, mud turtles (*Kinosternon* spp., 2.39 % n = 103).

Annual and seasonal variations

During the period from 2009 to 2019, there was an increasing trend in the total initial medical examinations. The percentage of clinical sessions increased compared to the previous year in 6 of the 10 years analyzed (Figure 1C). In two years, there was a marked decrease in the total number of cases compared to the previous year: 2010 (-19 %) and 2015 (-25 %). Regarding the frequency variation of clinical sessions for the 8 most common species; an increasing trend was found both in proportion and in the total number of consultations per year. This was more evident with the rabbits (*O. cuniculus*), guinea pigs (*C. porcellus*), african pygmy hedgehogs (*A. albiventris*), and mud tortoises (*Kinosternon* spp.) (Figure 2).

For example, in 2009, the teaching veterinary hospital only received 18 rabbits, compared with 193 received in 2019, which represented growth to almost one-third of all patients of that year (1 072 %). In the case of red-eared sliders (*T. scripta elegans*) the proportion decreased slightly in the last part of the period, but the total number increased (20.1 %, n = 126). For the ferret (*M. putorius furo*) and the green iguana (*Iguana iguana*) the proportion and total clinical sessions decreased by the end of the study period. For example, in 2009 iguanas represented 25 % of all patients received, and by 2019, they only were 5 %. In some species as the golden hamster (*M. auratus*), the frequency remained stable during all years of the study.

DOI: http://dx.doi.org/10.22201/fmvz.24486760e.2023.1083
Vol. 10 | 2023

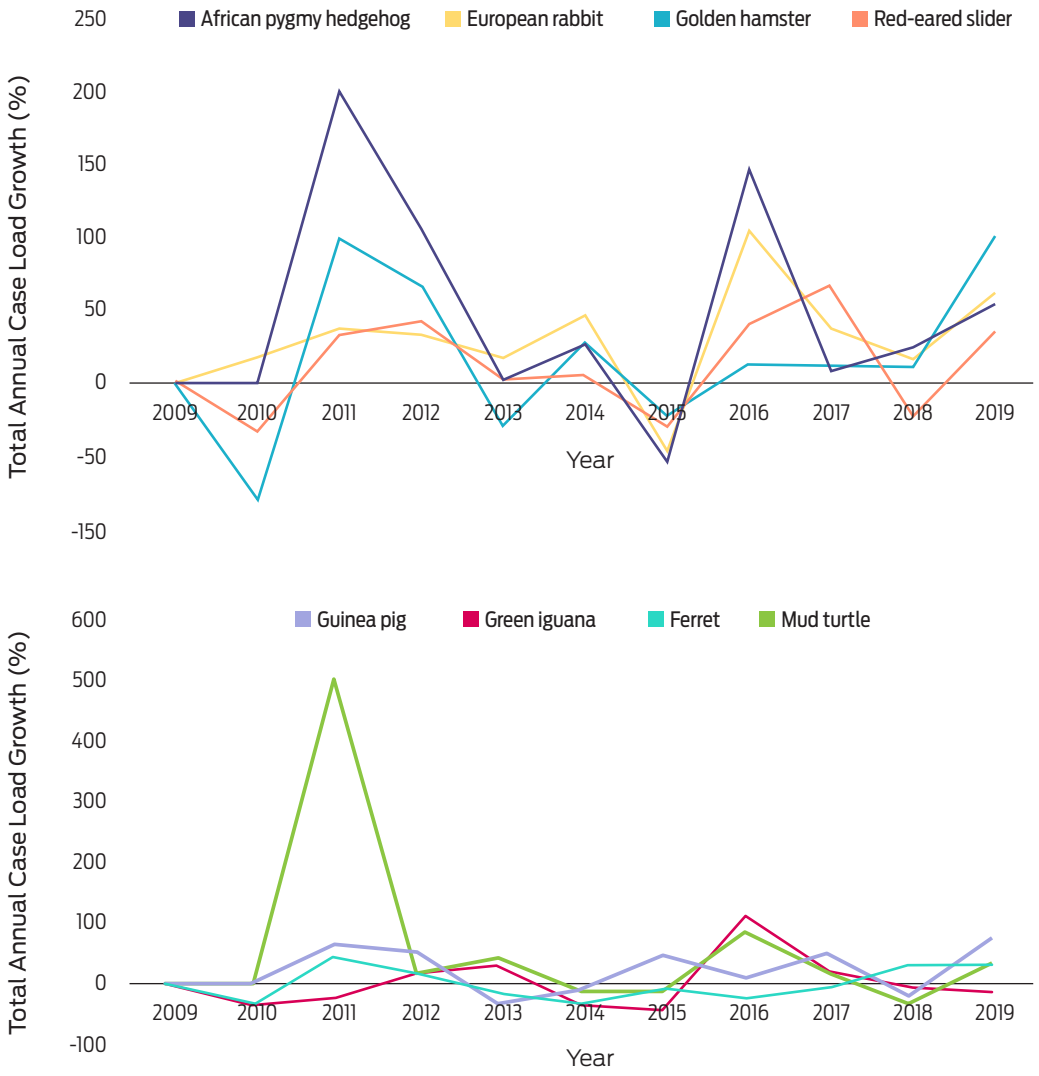

Figure 3. Total annual caseload growth and decrease for the 8 most common species received at consultation, in comparison to the previous one.

Annual growth over the previous year was determined for each of the 8 species (Figure 3). The rabbits (*O. cuniculus*) total annual case growth increased compared to the previous one in 9 of the 10 years evaluated. The same happened in 8 years for the African pigmy hedgehogs (*A. albiventris*), and in 7 years for red-eared sliders (*T. scripta elegans*) and golden hamsters (*M. auratus*). The guinea pigs (*C. porcellus*) total annual case growth increased with respect to the previous one in 7 of the 10 years evaluated. The same happened in 6 years for the mud turtles (*Kinosternon* spp.). In the case of green iguanas (*I. iguana*) and ferrets (*M. putorius furo*), it decreased in 6 of the 10 years evaluated. For six of these species, the percentage increase was greater than 0% in more than half of the study years.

The distribution of clinical sessions analyzed by seasons of the year was evaluated for the eight most common species. Statistical differences ($P < 0.05$) were found only in three of them. In the case of green iguana (*I. iguana*), the highest number of patients was received during winter, and there were statistical differences between summer and fall ($P < 0.05$), but not between winter and spring ($P > 0.05$). In the case of the ferret (*M. putorius furo*), the highest number of

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Vol. 10 | 2023

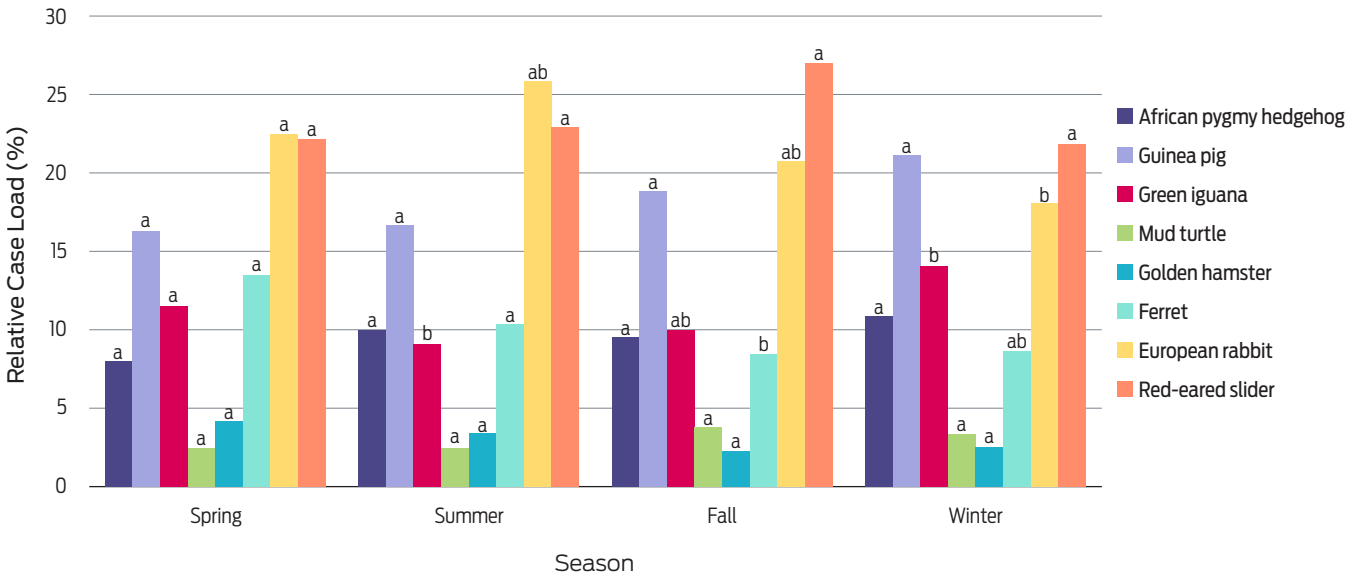

Figure 4. Relative caseload seasonal variation for the 8 most common species received at HVE-FSEC, between 2009 and 2019. Different literals mean significant differences $P < 0.05$.

patients was received during spring, and there were statistical differences in the total of patients received by season when compared to summer, fall, or winter ($P < 0.05$), but not between the last three ($P > 0.05$). For the rabbit (*O. cuniculus*), the total number of patients was significantly higher only when comparing summer to winter ($P < 0.05$) (Figure 4).

Discussion

The consultation of non-traditional companion animals has increased, and the most popular specie have varied over the years. At the same veterinary teaching hospital (UNAM-EPWTH), Hernández[9] reported only 1 137 clinical sessions and 96 different species received between 2005 and 2010. By 2019, the annual total number of clinical sessions and species diversity increased by 237.6 % (n = 3 838) and 34.3 % respectively. This may reflect the hospital capacity increase after remodeling in 2015. Starting May 2016, they increased service to 6 days per week. Offering clinical attention on Saturday may also have contributed. Thereafter the total number of annual clinical sessions increased by 32.16 % each year. Although, it is considered that factors such as the responsibility on the part of the owners toward their companion animals, for which they feel great affection and come to see them as part of their family, influence the number of individuals presented in consultation to be greater. On the other hand, the illegal trafficking of species, the availability and ease of acquiring them in the market allows the list of species kept as companion animals to be larger.[5, 12, 13] These results support that the overall demand for medical services for non-traditional companion animals increased in the last decade in the center of the country.

The total number of medical examinations performed in the UNAM-EPWTH increased the following year, except for 2010, 2013, 2016, and 2018 in which

DOI: http://dx.doi.org/10.22201/fmvz.24486760e.2023.1083
Vol. 10 | 2023

the case load decreased or stayed identical from the previous year. A series of different events occurred during those years that could indirectly affect the number of medical services provided. Between 2009 and 2010, there was an influenza A H1N1 pandemic, where many activities were suspended. Also, Mexico City suffered earthquakes of various magnitudes in some of these years. In 2015, the hospital was remodeled with a reduction in the capacity of services offered for 6 months and this was reflected in a decrease of 23 % (n = 79). Due to the fact that the number of consultations received per year is greater than a decade ago and the list of species seen in consultation is greater than those previously reported, it means that, as a teaching hospital where evidence-based medicine is practiced, more topics are discussed and evaluated in practice, therefore, this translates into experience gained in the field of non-conventional companion animals.

In Mexico it is necessary to request authorization from the government for the maintenance of non-traditional companion animals, however, this information is not known by most owners or veterinarians. If done regularly, the data could show which species are kept as companion animals. Martin[8] found it is difficult to evaluate non-traditional companion animal clinic services, or even determine which species are treated due to limited information recorded. It is important include carry censuses, including household pets to determine companion animal populations, and species identification. In this order idea, would be important to specify the species, or at least what type of animal it is. Alternatively, in hospitals and veterinary clinics that attend non-traditional companion animals, is necessary care and better record species specific information, to future analysis.

The non-traditional companion animal species recognition in veterinary medicine is fundamental, not only for proper clinical management and targeted education, but also to detect possible specimens from illegal trafficking. This also helps to raise awareness in owners. In this study, we found the presence of Mexican wildlife species that are listed in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and, according to Urias et al.[13] are among the most commonly illegally traded. Some of them were the yellow-headed parrot (*Amazona oratrix*), the scarlet macaw (*Ara macao*), the spider monkey (*Ateles geoffroyi*), the red-kneed tarantula (*Brachypelma smithi*), the Mexican spiny-tailed iguana (*Ctenosaura pectinata*), the green iguana (*Iguana iguana*), the rattlesnake (*Crotalus polystictus*) and the Harris's hawk (*Parabuteo unicinctus*), others species registered in the study as the jaguar (*Panthera onca*) and the ocelot (*Leopardus pardalis*) are not frequent but their maintenance as companion animals its worrying.

According with CITES, they are in the appendice I considered endangered, and international trade of this specimens is prohibited.[14] The presentation of some endangered species has increased over the years, such as the mud turtles (*Kinosternon* spp.), which was the eighth most common patient species. There is no legal path to extract these individuals from the wild environment nor to obtain them as legal companion animals. Keeping or buying these specimens in private homes in Mexico is punishable by the General Wildlife Law.[15] On the other hand, providing veterinary care is not considered a crime, and there is no mandatory legal requirements for veterinarians to report the possession of protected species. However, a legal report to authorities is strongly recommended. In this case, the UNAM-EPWTH receives patients regardless of their origin and legal status, but in case of receiving protected species without legal identification, hospitalization is not allowed.

DOI: http://dx.doi.org/10.22201/fmvz.24486760e.2023.1083
Vol. 10 | 2023

Regarding species groups, mammals followed by reptiles were the biggest groups received during the study period at the UNAM-EPWTH. This matches with previous reports made by Jenkins,[16] and by Burghardt,[17] where the demand for some species of reptiles and exotic mammals has been increasing in the United States since the 1980s. They proposed these species were compatible with the modern lifestyle and the desire to keep a companion animal. They are relatively calm, with low purchase price, and owners have relatively easy access to information for their care and feeding. This has also been observed in European countries, such as Switzerland and England, where small mammals and reptiles are the most frequent groups seen in veterinary practices, as reported by Martin,[8] and Wills & Holt.[18]

Only five species were reported to be the most frequent by Hernández[9] compared with the eight described in this study. In his results, the red-eared slider was also the most common species, followed by the green iguana (12.13%), the ferret (11.08%), the guinea pig (10.02%), and the rabbit (7.65%). In this study, three more species were considered due to the number of consultations, however, the 5 mentioned for Hernández above continue to be among the most frequent. The number of rabbits received as patients has increased in percentage and total numbers over time, probably because it meets all the characteristics previously described by Jenkins,[16] and Burghardt,[17] in addition to being an animal that is considered adorable, with a considerably low cost, it makes sense that it is quite popular.

In contrast, the number of ferrets and their proportion to the patient total has decreased considerably, at the end of the last century, they arrived as companion animals and the novelty was maintained for a few years. The owners possibly realized that the needs they required were not so simple, and the health problems that these specimens frequently present may have been another point to consider. In contrast with these results, in countries such as the United States, the American Veterinary Medical Association (AVMA)[19] has determined that between 2012 and 2018, the total number of rabbits and reptiles kept in captivity has increased, and a decrease in the number of ferrets kept as companion animals has also been reported.

In the seasonal analysis by species presented to the hospital, an apparent seasonal influence for 3 species was detected. During the winter months, the number of consultations for green iguanas was significantly higher, the explanation of this variation could be related to the fact that Mexico City is not part of the natural distribution range for this reptile, and the climatic characteristics may favor the presentation of signs of disease. Therefore, determining if there is a relation between the increase in reptile consultation during cold seasons and the possibility that low temperatures predispose the development of diseases, would be important. As mentioned by previous authors, reptiles require external thermal control for normal physiological processes.[20,21] This could be an underlying etiology for increased green iguana visits during the winter and extending into early spring.

As for ferrets, during the spring the number of patients received was significantly higher than at other times of the year. Summer was the season in which the number of rabbit consultations was significantly higher. For both species, the explanation may be due to a situation similar to that of green iguanas, being species of temperate climates. Environmental temperature could favor the presentation of alterations that are interpreted as signs of disease by owners during the hottest seasons in Mexico City. This should be studied further to identify other variables that explain the results obtained.

DOI: http://dx.doi.org/10.22201/fmvz.24486760e.2023.1083
Vol. 10 | 2023

Conclusions

The demand for medical care for non-traditional companion animals in Mexico City has been increasing during the last 10 years. The species that are frequently received for the medical examination have varied over time, and the list of species is expanding. Variation depending on geographic region is important to identify, with this data it is possible to study the species that could be received in consultation or request support from colleagues who have experience with certain species that are common in their country. By determining the most common species kept as non-traditional companion animals it is possible to focus veterinary medical student training by laying foundations for knowledge development and skills related to these species.

We suggest that public and private veterinary hospitals around the world report the total annual caseload of exotic or non-conventional pets. It would also be helpful if government human population censuses included information about other companion animal species than just dogs and cats to compare this with those seen in veterinary practices. Furthermore, by reporting this information, the current status of wildlife species that are kept illegally for these purposes can also be known.

DOI: http://dx.doi.org/10.22201/fmvz.24486760e.2023.1083
Vol. 10 | 2023

Data availability

All relevant data are within the manuscript.

Funding statement

This research was funded by Universidad Nacional Autónoma de México (www.unam.mx). The funder had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Conflicts of interest

The authors declare that they have no competing interests.

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Vol. 10 | 2023

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