

Capacity for care in an animal shelter in Paraná

A capacidade de prover cuidados de um abrigo de animais no Paraná

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ABSTRACT

High population density, inadequate physical structure, and a lack of human and material resources are the main problems faced by most dog and cat shelters in Brazil. Shelter Medicine is an area of Collective Veterinary Medicine that seeks to promote good levels of well-being for the animals, preventing stress and disease, reducing shelter time, and increasing the adoption rate. The situational diagnosis of the shelter should determine its Capacity to Provide Care (CPC), a management model that aims to meet the basic needs of the animals housed. The purpose of the study was to assess the CPC of an animal shelter in the state of Paraná in terms of the capacity of its physical structure and the staff's capacity to provide basic daily care (feeding, cleaning, and sanitizing) and human-animal interactions. The evaluation occurred at the "DNA Animal" shelter in Fazenda Rio Grande, Paraná, which houses 160 dogs. The following tools were used for data collection: a situational diagnosis form containing information about the physical structure of the institution, a sketch of the shelter, a monthly control sheet for the entry and exit of dogs, and an interactional ethogram. During five days at the shelter, human-animal interaction was assessed, and the basic care activities were timed to calculate the CPC metrics: Actual Physical Holding Capacity (AC), Required Physical Holding Capacity (RHC), and Staff Capacity for Daily Care (SCDC). The average time spent on daily care per animal sheltered was 5.37 min, below the internationally recommended 15 min/animal, due to the low number of staff at the institution. To assess the effectiveness of daily care, we evaluated whether all the animals were fed twice a day and whether the recommended cleaning and sanitizing protocol (CSP) was followed; 100% of the animals were fed twice a day, and the CSP was not applied correctly, since detergent and disinfectant were mixed to speed up cleaning, a practice that inhibits the action of the disinfectant. The calculated SCDC was 74.5%, 100% for the feeding protocol, and 57.5% for the CSP. As for the AC and RHC, depending on the recommendations used, the institution does not meet the structural requirements of the enclosures. The shelter needs to increase staff and include human-animal interaction activities as a routine practice. There is also a flaw in the shelter's management about relocating the animals to reduce the number of dogs in overcrowded areas. The metrics used in the study proved sufficient to contribute to future adjustments and improvements in the management of Brazilian dog and cat shelters and the well-being of animals and staff.

Keywords: Population management. Shelter medicine. Management. Abandonment of dogs and cats. Collective veterinary medicine.

RESUMO

A alta densidade populacional, a estrutura física inadequada e a falta de recursos humanos e materiais são os principais problemas enfrentados pela maioria dos abrigos de cães e gatos no Brasil. A Medicina de Abrigos é uma área da Medicina Veterinária do Coletivo que busca promover bons níveis de bem-estar para os animais, a fim de prevenir estresse e doenças, diminuir o tempo do abrigamento e aumentar a taxa de adoção. O diagnóstico situacional do abrigo deve determinar a sua Capacidade de Prover Cuidados (CPC), modelo de gestão que visa atender as necessidades básicas dos animais alojados. Objetivou-se avaliar o CPC de um abrigo de animais do estado do Paraná no que se refere à capacidade da sua estrutura física, da sua equipe em prover os cuidados diários básicos (alimentação, limpeza e higienização) e prover interações humano-animal. A avaliação ocorreu no abrigo "DNA Animal", localizado no município de Fazenda Rio Grande, Paraná, que abriga cerca de 160 cães. Como ferramentas para a coleta de dados utilizou-se: uma ficha de diagnóstico situacional contendo informações acerca da estrutura física da instituição; o croqui do abrigo; a planilha de controle mensal de entrada e saída de animais; e um etograma interacional. Durante 5 dias no abrigo foi realizada a avaliação da interação humano-animal e a cronometragem das atividades de cuidados básicos para o cálculo das métricas da CPC: Capacidade de Estrutura Física Real (CR), Capacidade de Estrutura Física Requerida (CEFR) e Capacidade da

Equipe para Cuidados Diários (CECD). A média do tempo empregado para os cuidados diários por animal abrigado foi igual a 5,37 minutos, valor abaixo do recomendado internacionalmente de 15 minutos/animal, devido ao baixo número de funcionários na instituição. Para avaliação da eficácia dos cuidados diários, avaliou-se se todos os animais eram alimentados duas vezes ao dia e se o protocolo de limpeza e higienização (PLH) recomendado era seguido; 100% dos animais eram alimentados duas vezes ao dia; e o PLH não era aplicado corretamente, uma vez que o detergente e desinfetante eram misturados para agilizar a limpeza, prática que inibe a ação do desinfetante. A CECD calculada foi de 74,5%, sendo 100% para a realização do protocolo de alimentação e 57,5% para a execução do PLH. Quanto à CR e CEFR, a depender das recomendações utilizadas, as exigências estruturais dos recintos não são cumpridas pela instituição. Há necessidade de o abrigo aumentar o número de funcionários e incluir as atividades de interação humano-animal como prática de rotina. Há uma falha na gestão do abrigo em relação à realocação dos animais para diminuir o número de cães em áreas superlotadas. As métricas utilizadas no trabalho demonstraram ser suficientes para contribuir em futuras adequações e melhorias na gestão dos abrigos brasileiros de cães e gatos e no bem-estar dos animais e dos colaboradores.

Palavras-chave: Manejo populacional. Medicina de abrigos. Gestão. Abandono de cães e gatos. Medicina veterinária do coletivo.

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Introduction

Dog and cat population management (DCPM) and Brazilian shelters' physical and resource conditions are growing political and social concerns (Arruda et al., 2019). According to a survey conducted by the Instituto Pet Brasil (2022), there are approximately 400 non-governmental organizations (NGOs) in Brazil that shelter approximately 184,960 animals, of which 96% are dogs (177,562), and 4% are cats (7,398). Despite this, no unified national legislation establishes mandatory public policies and the ideal standard for Brazilian dog and cat shelters (Santos, 2022).

DCPM refers to a set of intervention strategies to model the population dynamics of companion animals (Baquero, 2015), in which shelters play a fundamental role by adopting the 4Rs of population management programs: selective rescue, recovery, re-socialization and reintroduction into society (Garcia, 2019). Population dynamics (PD) relates to the size of the dog and cat population, both inside and outside the shelter. At the shelter, PD is an essential organizational policy, monitored by the entry (admission

and return) and exit (adoption and mortality) of animals from the institution (Galdioli et al., 2023).

Shelters have limited capacity in their facilities to maintain the necessary care for the animals (Arruda et al., 2020) due to the staff's lack of management and strategic planning, resulting in overcrowding in the institutions. According to the National Animal Care & Control Association (2019), each animal requires 6 min for feeding and 9 min for cleaning, for a total of 15 min of daily care. However, this parameter was defined according to the US reality, and Brazilian shelters have no pre-established standard. The capacity to assist and promote this humane care depends on the number and condition of animals sheltered, the length of stay, the size and number of enclosures available, and the number and training of staff (Newbury et al., 2018).

Shelter Medicine (SM) is an area of Veterinary Medicine focused on understanding the possible obstacles encountered when keeping animals in collective environments, always seeking to promote good levels of welfare and a better quality of life for each sheltered animal (Garcia, 2019). The Capacity to Provide Care (CPC) is a shelter management model that aims to meet the basic needs of all admitted animals (Rocha & Galdioli, 2022). Although each shelter is unique, with its particularities and positive and negative aspects (Lima & Garcia, 2019), CPC must be adopted in all institutions to establish conditions for a good quality of life for dogs and cats. For this reason, the CPC assessment is a good strategy for carrying out a situational analysis of an animal shelter.

This study aimed to assess the Capacity to Provide Care (CPC) of an animal shelter in the state of Paraná in terms of the shelter's physical structure, the capacity of the staff to provide daily care (feeding, cleaning, and sanitizing), and the capacity of staff to provide human-animal interactions.

Materials and Methods

The “DNA Animal” shelter is a non-profit organization located in Fazenda Rio Grande, Paraná, in the metropolitan region of Curitiba. With a total area of 2,006.15 m², the institution has an average of 160 dogs, which have been taken in and are offered for adoption. The shelter’s visits for the CPC analysis were carried out in July 2023. From the data collected, it was possible to infer some relevant metrics for assessing the Capacity to Provide Care: Actual Physical Holding Capacity (AC), Required Physical Holding Capacity (RHC), and Staff Capacity for Daily Care (SCDC).

The AC corresponds to the number of available accommodation units that are adequate in safety and size in each facility analyzed. The number may vary according to the type of enclosure and the animal housed (Newberry & Hurley, 2013; Cho et al., 2015; University of California, 2015; Galdioli et al., 2022).

The RHC represents the number of housing units needed to keep the animals for any period before adoption. This

measure is calculated by multiplying the average monthly number of animals entering the shelter by the average length of stay (Newberry & Hurley, 2013; Cho et al., 2015; University of California, 2015; Galdioli et al., 2022).

The SCDC refers to the number of employees who can adequately care for the animals sheltered daily, based on national and internal standards. It is calculated by dividing the time required to complete a task by the time available to complete this task. The time needed for a task is calculated by multiplying the minutes required per animal by the number of animals in the enclosure and dividing this result by sixty minutes (Newberry & Hurley, 2013; Cho et al., 2015; University of California, 2015; Galdioli et al., 2022).

Initially, the data collection tools used were a situational diagnosis form (Annex A), based on the document improved by Garcia et al. (2022), which allows a broad assessment of shelters’ internal and external policies; the sketch of the space analyzed (Figure 1); and the control of animals entering and leaving the shelter in 2022 (Table 1). Regarding



Figure 1 – Shelter’s sketch with the number of animals per enclosure (18/07/2023 to 22/07/2023).
Source: Shelter Veterinary Medicine Project UFPR, 2022.

the situational diagnosis, greater emphasis was placed on diagnosing the shelter's physical structure.

The capacity of the physical structure was assessed by evaluating the space and analyzing its floor plan (Figure 2). As outlined in the document "Shelter Quality - Welfare Assessment Protocol for Shelter Dogs," a protocol that assesses the institution at the shelter, kennel, and individual animal level, data collection included general information about the shelter, such as the number of animals, the number of animals per housing unit, the number and size of existing units, the presence of outdoor enclosures, and the existence of risk points (Barnard et al., 2014).

Evaluating the staff's ability to provide daily care (feeding, cleaning, and sanitizing) and the staff's ability to provide human-animal interactions required daily monitoring of the institution's employees. The time spent on each basic care task was observed and timed over five days to determine the average time spent on these specific activities and the shelter's flow. To determine the effectiveness of the SCDC,

the number of meals offered to the animals was scored from 0 to 5, with 0 being ineffective (0 meals per day or every other day and 100% of the animals having difficulty

Table 1 – Shelter's population dynamic in 2022. DNA Animal Shelter, 2022

Month	Number of Entries	Number of Adoptions (Exits)
January	5	1
February	2	4
March	0	0
April	1	3
May	3	2
June	0	2
July	14	2
August	3	5
September	4	1
October	6	4
November	1	2
Dezember	0	2
Total	39	28

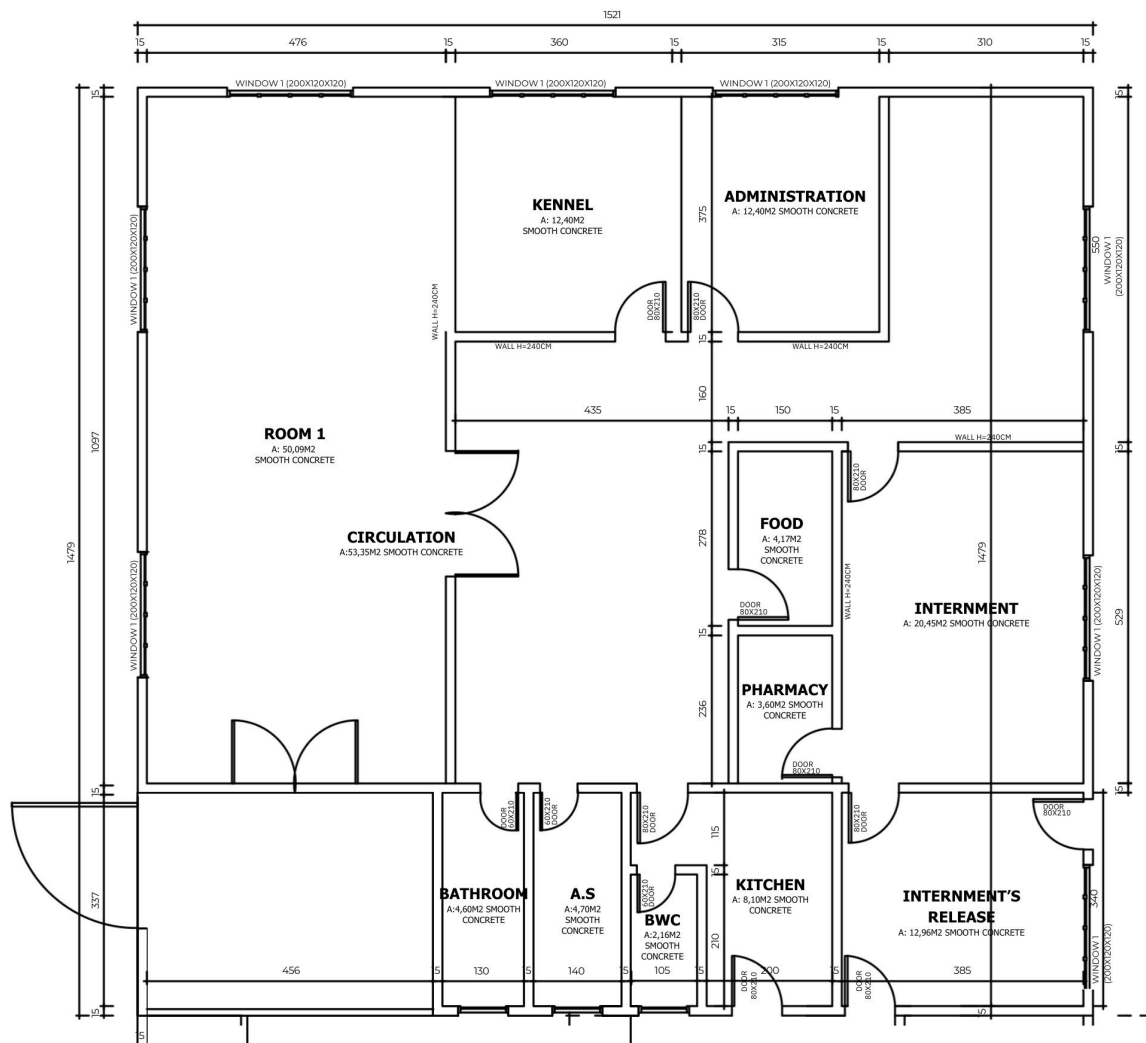


Figure 2 – Shelter's floor plan.
Source: DNA Animal Shelter, 2023.

accessing the feeder), three being regular (one meal per day and 50% of the animals having difficulty accessing the feeder) and 5 being effective (two meals per day and 100% of the animals having access to the feeder); and whether the cleaning and sanitizing protocol (CSP) was applied correctly. For the CSP, the execution of each stage of the protocol was evaluated separately, scoring each indicator from 0 to 5: removal of animals; removal of solid waste before washing; washing with detergent; rinsing off the detergent; washing with disinfectant; holding the disinfectant for 10 min; rinsing off the disinfectant; and drying. With 40 points, the correct completion of all the steps indicates 100% agreement with the cleaning protocol.

Thus, for the final effectiveness of the SCDC, the weighted average of the results found is calculated, considering that, in the international recommendations for individual stalls, 6 min are required for feeding (40% of the total time for daily care) and 9 min for cleaning (60% of the total time for daily care). Therefore, the result found for feeding weighs 40% when calculating final efficiency, while the result for cleaning weighs 60%.

The staff's ability to provide human-animal interactions was assessed through an interactional ethogram of the staff with the sheltered species (Table 2), based on the Human-Dog Interaction and Training Protocol (HDI and TR) (Baldan, 2022) and formulated to categorize the interaction observed during the animal's contact with the staff. The type of interaction was also recorded during the five days analyzed.

Human-dog interactions are characterized by cuddling, playing, and walking, preferably outside kennels and stalls for 10 min (Baldan, 2021). Observing and recording the use of interaction protocols and training with basic commands are essential ways of assessing the team's ability to provide human-dog interactions, as it is possible to simultaneously verify behavioral changes in the sheltered animals, which reduce, from the first day of application, their negative behaviors, such as excessive barking and destruction of objects, and indicators of stress, such as gaze deviation, recoil and body tremors (Baldan, 2021). The HDI refers to human-animal interactions outside the stall, allowing dogs

to exercise and feel different smells and textures. At the same time, TR refers to a set of basic training commands associated with cuddles and treats (Baldan et al., 2023).

Results and Discussion

From the analysis of the sketch (Figure 1) and the previous situational diagnosis of the shelter (Annex A), the following spaces were found in the site visited: quarantine area, infirmary, socialization and recreation area, laundry, isolation area, collective stalls (from 3 to 10 dogs) and a place for cleaning products. As for the stalls, there is a kennel with a solarium for elderly dogs, which allows them to meet their specific needs according to their age. The boarding area also has a solarium, but the other internal stalls are just kennels.

The quarantine and isolation areas are essential for preventing infectious diseases. In isolation, dogs with clinical signs are separated from the shelter population to facilitate their treatment and protect the other dogs (Polato et al., 2021), unlike quarantine, which is intended for healthy dogs that recently arrived at the shelter (Paraná, 2016) and for healthy dogs but suspected of being infected, to observe the possible development of the disease (Polato et al., 2021). Both spaces should be organized in individual stalls to reduce the likelihood of cross-contamination and in separate places from the rest of the institution and from each other since previously isolated dogs must remain in quarantine for 10 to 14 days before returning to common areas (Polato et al., 2021). However, in the shelter analyzed, the quarantine and the isolation areas are kept together during internment, allowing contact between dogs with infectious diseases, injured dogs, and newly admitted dogs. In addition, there is no separation between clean and contaminated areas in the institution, which is a major risk factor for the shelter, as there is a flow of people, fomites, and dogs from critical areas to non-critical areas (Garcia, 2019).

For Galdioli & Simon (2022), the use of collective housing is a consequence of the lack of space in Brazilian shelters or the lack of planning for the construction of kennels in large spaces of the shelter, resulting in an increase in the infectivity of diseases and difficulties in the individual monitoring of animals, which can lead to negative interactions and problems with access to water and food. However, it is necessary to consider that feeding and sanitizing become quicker and less laborious because the shelter is organized in collective stalls and, consequently, in single, continuous environments.

In terms of staff, the shelter has five employees, four of whom work on a rotating basis (12 h × 36 h) from 8 am

Table 2 – Human-animal interaction ethogram

Human Behavior	Description
Providing snacks	Offers positive behavior reinforcement
Offering toys	Offers bonés, balls and ropes for the animal
Offering cuddles	Interacts with cuddles spontaneously and/or at the animal's request
Training	Uses basic commands (together, sit, down, stay, here, up and paw)

Source: Self-authored (2024).

to 8 pm, and one who works Monday to Friday from 8 am to 5 pm (9 h a day). The team comprises three employees during the week, each working on treating internal kennels, external kennels, or internment, and two employees on the weekend. Adding up the staff's working hours, there are theoretically 33 h available each working day for daily care and 24 h per day at the weekend.

While monitoring the shelter's routine, the institution's feeding protocol was analyzed. The dog's feeding was supervised by a member of the staff, who administered the food according to the dog's individual needs, which received premium, senior, hypoallergenic, or gastrointestinal food served in their containers. However, regardless of the weight and size of the dog, they all received the same amount of food. Regarding the maintenance of the external areas, given the larger size and the presence of only one employee, the monitoring and distribution of food was carried out during waste collection. Inside the confinement areas, while fed, the dogs were also medicated by drugs incorporated into the food. A second treatment was carried out daily in the afternoon, which included food distribution to all the dogs.

The site's cleaning and sanitizing protocol (CSP) was followed daily, maintaining a uniform approach. The morning routine began with the removal of solid waste from all the enclosures, as well as changing the dog's bedding. Soiled blankets were replaced in the morning and separated for later washing, which took place in the afternoon. The stalls were sanitized and cleaned using soap, bleach, and water. The dogs remained on-site during the procedure. The cleaning products were applied together and rinsed immediately after cleaning the area without waiting for the disinfectant to act. However, in the outdoor kennels of the enclosures that have them, disinfection with cleaning products was performed while the dogs were unleashed, allowing them to play, interact, and urinate individually. The dogs were also rotated during the cleaning process in the internment enclosures, allowing them to interact and perform natural behaviors.

Table 3 shows the timing of each activity performed over the five days analyzed, except for blanket washing, which was not included in the calculations of the basic daily care, and the number of dogs cared for in each activity examined.

Based on the analysis of the data presented, the average time spent on basic daily care per sheltered animal is 5.37 min, which is considerably less than the 15 min recommended by the "National Animal Care & Control Association" (2019). To calculate the Staff Capacity for Daily Care (SCDC), the data obtained shows that for 160 dogs and 15 min of care per animal, 40 h are required. Adding up the time spent each day and calculating the average of these values, the average time available per employee for daily care is 5.13 h. Thus, eight employees must work at the shelter for 15 min daily.

In less than half the recommended time, the shelter staff managed to feed all the dogs twice a day, with 100% opportunity to access the feeding trough, indicating effectiveness and a maximum score (5 points) in applying the feeding protocol. The ability to feed was achieved by monitoring feeding in the collective kennels. However, 5.37 min was not enough time to sanitize all the areas. Following the evaluation of the CSP for the shelter analyzed, we have removal of the animals (3 points out of 5: removal in the external kennels and the internment area only), removal of solid waste (5 points: removal of waste before cleaning), washing with detergent (1 point out of 5: efficient washing), rinsing off the detergent (5 points: efficient rinsing), washing with disinfectant (5 points: efficient rinsing), disinfectant maintenance (0 out of 5 points: no maintenance), rinsing off the disinfectant (3 out of 5 points: simultaneous rinsing of detergent and disinfectant) and drying (5 points: efficient draining of wash water); totaling 23 out of 40 points (57,5%). The CSP was not applied correctly in its entirety, jeopardizing the shelter's disinfection since the detergent and disinfectant were mixed with speeding up cleaning, a practice that inhibits the action of the disinfectant, reduces the effectiveness of the detergent, and can generate toxic fumes for humans and animals. The prior removal of all

Table 3 – Timing and calculation of daily care per animal (in minutes). DNA Animal Shelter, 07/2023

		Day 1	Day 2	Day 3	Day 4	Day 5	AVERAGE
1	Daily cleaning	136.75	146.67	125.1	182.98	147.52	-
	1.1 Number of animals in sanitized kennels	50	77	32	78	44	-
	1.2 Time per animal	2.73	1.90	3.91	2.35	3.35	2.85
2	Food (morning)	40.06	124.8	43.88	104.52	159.65	-
	2.1 Number of animals fed (morning)	47	79	29	78	100	-
	2.2 Time per animal	0.85	1.58	1.51	1.34	1.6	1.38
3	Food (afternoon) and maintenance cleaning	45.2	51.53	79.72	109.42	45.17	-
	3.1 Number of animals fed (afternoon)	47	47	47	110	47	-
	3.2 Time per animal	0.96	1.1	1.7	0.99	0.96	1.14
Total (Time per animal)		4.54	4.58	7.12	4.68	5.91	5.37

organic matter and detergent ensures the complete action of the disinfectant and is an essential step in the protocol (Medicina de Abrigos Brasil, 2022). Therefore, for the SCDC, taking the weighted average of the results for feeding and cleaning, the effectiveness is 74.5%. A new proposal for the recommended time for daily care in Brazilian shelters should be considered.

The footage per animal in each area analyzed was calculated to assess the institution's physical structure. Despite having different names, all the areas mentioned function as kennels, housing dogs regardless of their original purpose. Based on the floor plan of the shelter (Figure 2) and the number of dogs per enclosure (Figure 1), internally, there is 4.17 m² per dog in room 1, 2.3 m² in the bathroom (BWC), 4.05 m² in the kitchen; 3.6 m² in the pharmacy; 1.46 m² in the internment; 1.62 m² in the room below the internment, which corresponds to the internment's release; 2.07 m² in the administration area; 2.48 m² in the room (or kennel) next to the administration area; and 2.67 m² per dog in the entire circulation area. According to the "Shelter Quality - Welfare Assessment Protocol for Shelter Dogs," for one or two animals under 20 kg, 4 m² is required in the kennel, plus an additional 2 m² for each animal of the same size. For animals over 20 kg, 8 m² is required for one or two dogs, with an additional 4 m² added to the enclosure for each animal of the same size (Barnard et al., 2014). In addition, the CRMV-PR recommends that each animal have a minimum internal area of 1.5 m² in kennels with a solarium and a minimum external area of 2.5 m² (Paraná, 2016). However, only two indoor stalls analyzed had a solarium: the internment and the elderly kennel, part of the common "circulation" area. The dogs assigned to the other areas participate in a rotation system, in which some dogs leave the indoor environment to socialize and have access to the sun and the open air for a maximum of one hour.

Although the stalls are communal and do not have a specific apparent area for each animal, the Actual Capacity (AC) of the shelter could be determined by dividing the size of the enclosure by the recommended area for each dog. In most enclosures, each animal has a bed (inside) or house (outside) and two additional housing units so the dogs can choose where to lie down. In the so-called "circulation" area, the dogs had only pallets with blankets to use together. It is recommended that the number of animals in collective kennels, where each animal requires approximately 2 m² of space, should not exceed the limit of 15 dogs (Minas Gerais, 2019).

The calculation of the Required Physical Holding Capacity (RHC) suggested by international literature is

not adequate for the reality of Brazilian shelters since, as observed in the institution, the average length of stay until the adoption is very long, and the number of monthly exits is relatively low compared to the number of arrivals since the population that leaves is quickly replaced. In addition, in some seasons, no dogs leave the organization, which increases the previously stable number of dogs in care.

In this way, the RHC can be calculated by determining the ideal number of kennels to meet the shelter's existing demand, using recommended metrics as a reference. Following national (Paraná, 2016; Minas Gerais, 2019) and international (Barnard et al., 2014) recommendations as parameters for comparison, the AC and RHC of the "DNA Animal" institution are observed in Table 4.

Depending on the recommendations, the shelter does not meet the structural requirements of the enclosures, indicating that it is overcrowded and has exceeded its capacity limit. However, by relocating the animals according to their behavior, affinity, and health condition, it is possible to improve this condition and reduce the number of animals in overcrowded areas. Currently, the shelter organization lacks efficiency since there has been no planning to solve the high demand at the site (Santos, 2022). In addition, it should be considered that the calculation was made only for indoor stalls, most of which do not have solariums, which is a gap in the shelter's infrastructure. For this reason, the recommended footage for the exterior of each enclosure was not used.

Another critical issue is the use of the circulation area as a kennel. The flow of staff and dogs who have been hospitalized, will be rehomed, or are rotating to the outside environment occurs among other dogs, which is stressful for them. The physical structure of the shelter affects the behavior and stress levels of the staff and the dogs and is of great importance in placing the animals in permanent adoptive homes (Galdioli & Simon, 2022). In this way, the presence of clear halls that facilitate the passage and handling of the dogs is favorable for reducing negative behaviors and for the effectiveness of adoption, including allowing prospective adopters to visit the shelter (Galdioli & Simon, 2022) and observe the dogs, a practice not currently allowed at the shelter analyzed.

Outside, some enclosures had individual kennels. In the sketch of the shelter (Figure 1), these enclosures are identified as "Sections A, B, C, D, E, F". In these, we could see up to 3 dogs per kennel participating in the shelter's rotation system. Although, depending on the recommendation adopted (Table 5), they did not have enough space to accommodate the dogs, the rotation in free areas for socialization, leisure,

Table 4 – AC and RHC according to different footage recommendations. DNA Animal Shelter, 07/2023

INDOOR AREA			Paraná (2016)		Minas Gerais (2019)		Barnard et al. (2014)	
			1.5 m ² per animal		2 m ² per animal		4 m ² + 2 m ² per additional animal	
Footage (m ²)	Nº of dogs	AC (nº)	RHC	AC (nº)	RHC	AC (nº)	RHC	
Room 1	50.09	12	33	18 m ²	25	24 m ²	24	26 m ²
Bathroom	4.60	2	3	3 m ²	2	4 m ²	1	6 m ²
Kitchen	8.10	2	5	3 m ²	4	4 m ²	3	6 m ²
Pharmacy	3.60	1	2	1.5 m ²	1	2 m ²	0	4 m ²
Internment	20.45	14	13	21 m ²	10	28 m ²	9	30 m ²
Internment's release	12.96	8	8	12 m ²	6	16 m ²	5	18 m ²
Administration	12.40	6	8	9 m ²	6	12 m ²	5	14 m ²
Kennel	12.40	5	8	7.5 m ²	6	10 m ²	5	12 m ²
Circulation	53.35	20	35	30 m ²	26	40 m ²	25	42 m ²
OUTDOOR AREA			4 m ² per animal		2 m ² per animal		4 m ² + 2 m ² per additional animal	
Entrance Hall	26	3	6	12 m ²	13	6 m ²	12	8 m ²
Section A	195	13	48	52 m ²	97	26 m ²	96	28 m ²
Section B	195	9	48	36 m ²	97	18 m ²	96	20 m ²
Kennel 1	182	15	45	60 m ²	91	30 m ²	90	32 m ²
Section C	78	5	19	20 m ²	39	10 m ²	38	12 m ²
Section D	36	5	9	20 m ²	18	10 m ²	17	12 m ²
Section E	130	8	32	32 m ²	65	16 m ²	64	18 m ²
Section F	221	5	55	20 m ²	110	10 m ²	109	12 m ²
Parking lot	168	10	42	40 m ²	84	20 m ²	83	22 m ²
Kennel 2	156	7	39	28 m ²	78	14 m ²	77	16 m ²

Table 5 – Analysis of individual kennels according to different footage recommendations. DNA Animal Shelter, 07/2023

Interaction	Description	Interaction frequency	Total	Nº of animals assisted	Total	
1	Providing snacks	Positive behavior reinforcement		12		8
2	Offering toys	2.1 Bone offer	-	-	-	-
		2.2 Ball offer		1		1
		2.3 Rope offer	-	-	-	-
3	Offering cuddles	3.1 Cuddle sought by the dog	 	76	 	59
		3.2 Cuddle offered by the employee	 	54	 	41
4	Training	4.1 Command: together	-	-	-	-
		4.2 Command: sit		9		5
		4.3 Command: down		1		1
		4.4 Command: stay	-	-	-	-
		4.5 Command: here		1		1
		4.6 Command: up		3		1
		4.7 Command: paw		4		4

and exposure to the sun during an appropriate time was an appropriate alternative used by the institution. The animals isolated in these kennels were dogs that were difficult to socialize and usually did not accept other animals, making it difficult to relocate them.

For enclosures without kennels, the dogs were housed together. Despite being outside, it is still recommended that the number of animals does not exceed the limit of 15 dogs (Minas Gerais, 2019). In areas with kennels, the total footage of the enclosure corresponds to the leisure

area of the animals housed there. After calculating the AC and RHC of the external space of the shelter (Table 3), it was concluded that all the enclosures complied with the size recommendations and had a larger area than necessary per dog and an occupancy less than or equal to the accommodation limit. During the day, the dogs in this area and those in the "Release from Internment" area were housed in the "Parking Lot."

The number and type of interactions during the five days analyzed were recorded concerning human-animal

Table 6 – Human-animal interaction for five days. DNA Animal Shelter, 07/2023

Enclosure	No. of individual kennels	Kennel footage (m ²)	No. of animals per kennel		Minas Gerais (2019)	Barnard et al. (2014)		
					5 m ² per animal	4 m ² + 2 m ² per additional animal		
1. Section A	2	6	1.1	2	Inadequate	Adequate		
					1.2	3	Inadequate	Inadequate
2. Section B	7	16		1	Adequate	Adequate		
3. Section C	2	8		1	Adequate	Adequate		
4. Section D	3	6	4.1	2 (2 kennels)	Inadequate	Adequate		
					4.2	1	Adequate	Adequate
5. Section E	4	16	5.1	1 (2 kennels)	Adequate	Adequate		
					5.2	2	Adequate	Adequate
					5.3	3	Adequate	Adequate
6. Section F	2	6		2	Inadequate	Adequate		

interaction. Interactions occurred momentarily and unplanned while the dogs were being cleaned and fed. No period of the team's routine was made exclusively available for the interaction and socialization of the sheltered dogs, even though human-dog interaction is categorized as social environmental enrichment and needs to occur outside of cleaning and feeding activities (Galdioli et al., 2021a, 2021b). Of the 12 daily work hours, 5.13 were allocated to daily care, leaving 6.87 for other activities, including interaction. Thus, there is a flaw in the shelter's management about the lack of guidance and training for staff interacting with the animals. Just as there is a rotation of dogs in the leisure areas, it is possible to implement a rotation for human-dog interaction when going outside.

As shown in Table 6, the most common interactions were affection sought by the dog and affection offered by the employee, respectively. The interactions classified as training were only carried out by a few employees since only these had completed the training for the use of the Training Protocol (Baldan, 2021) for dogs, which is necessary for its applicability and operation (Baldan, 2021).

Evaluating the staff's and shelter's capacity to provide care and human-dog interactions, it is verified that the excess of dogs in the institution harms the type and frequency of contact between staff and dogs. Working within the shelter's capacity limits allows for more daily care per animal and frequent, individualized monitoring of each sheltered dog. In this way, the level of interaction changes from momentary and unplanned to habitual and intentional, allowing training to be applied to reduce negative behaviors and increase the dog's reliability. These complex interaction protocols promote calm body postures, less vocalization, and fewer jumps to greet,

indicating less stress and greater animal well-being (Herron et al., 2014).

Concerning the high demand for affection from dogs, shelter animals prefer this interaction, probably because of their deprivation and the stressful environment that increases the value of receiving affection from the animal (Feuerbacher & Wynne, 2015). This interaction is vital for stimulating social behavior and forming interspecific bonds. However, due to overcrowding, dog socialization is hindered since most of the shelter population is not the target of spontaneous interaction. It should be noted that naturally, more reclusive animals may not seek interaction and, due to lack of time, may not receive the necessary attention from staff, making it difficult for them to be adopted and placed in a home.

Conclusion

The international parameters for applying the ideal management in animal shelters do not correspond to the Brazilian reality due to the differences between the structures and organization of national and foreign institutions and the lack of knowledge of the principles of shelter medicine. It is necessary to create protocols and policies, both internal and external, for the shelter to standardize the structural and management character of the enclosures and avoid obstacles in the management and planning of the institution's resources.

Brazilian shelters must adapt their facilities and respect the maximum capacity for care and accommodation, which should not be exceeded so that the stress level is not a limiting factor in the adoption process and in guaranteeing the animal's five freedoms. Furthermore, human-animal interaction should be treated as essential and not as an additional aspect of the animal's daily care.

The metrics used in this study and the evaluation proved sufficient to contribute to future adjustments and improvements in managing Brazilian dog and cat shelters and the welfare of animals and staff. Hopefully, this study will demonstrate the importance of using metrics in animal shelters.

Conflict of Interest

There are no conflicts of interest.

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Ethics Statement

This study was approved by the Ethics Committee on the Use of Animals (CEUA) of the Agricultural Sciences Sector of the Federal University of Paraná, under protocol n°. 005/2020.

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Annex A – Situational Diagnosis

Shelter's name: DNA Animal

Shelter's nature: Private shelter

Location: Fazenda Rio Grande - Paraná

PHYSICAL STRUCTURE

1. Does the shelter have a quarantine area? (Quarantine: space for keeping newly admitted animals to observe signs of infectious diseases)

Yes No

2. Does the shelter have an area for a nurse's room?

Yes No

3. Does the shelter have individual stalls or collective stalls?

Answer: Collective stalls for 3 to 10 animals.

4. Does the shelter have a solarium for the animals (outside area next to the stalls)?

Answer: In some stalls, yes; in others, no.

5. Does the shelter have a socialization/leisure area for the animals (beyond the individual stalls and solarium)?

Yes No

6. Does the shelter have an isolation area? (Isolation: an isolated area for animals with signs of infectious diseases)

Yes No

7. Does the shelter have a specific area for storing cleaning products?

Yes No

8. Does the shelter have a specific place for laundry?

Yes No

9. Does the shelter have an operating room?

Yes No

10. Does the shelter separate the areas into clean and contaminated areas? (Clean area: where the risk of developing infections is minimal or non-existent, either because there are no activities that could compromise this area or because there are no processes involving materials or animals from the contaminated area; Contaminated area: where there is a high risk of developing infections or transmission due to the presence of animals with signs of infectious diseases, or the flow of people who can serve as fomites)

Yes No