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Development and use of a welfare assessment protocol

for shelter cats in different Slovenian shelters

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Ethics statement

Acknowledgments and author contributions

Abstract

Ensuring the welfare of animals is of paramount importance nowadays and is becoming an important aspect of the various environments in which animals are housed. In recent years, welfare assessments initially focused only on species such as cattle, chickens, horses, donkeys, turkeys, pigs, goats and sheep. Awareness of the welfare of other animal species, such as cats, used to be much more trivial, but nowadays it is becoming increasingly important. Cats are becoming more and more popular as pets. Therefore, it is important to ensure that cats have an environment that is conducive to their well-being. Cat welfare is also of paramount importance in animal shelters, where cats are often exposed to various stressful situations. However, in order to assess the welfare of cats in animal shelters, a specific protocol for such an assessment is required. There are several protocols for assessing animal welfare, which are based on the concept of multidimensionality, physical parameters and parameters believed to reflect mental state of the animal. One of them is protocol for assessing the welfare of dogs in animal shelters, however, there is currently no standardised protocol for assessing the welfare of cats in animal shelters. Therefore, the main objective of this study was to develop a comprehensive protocol for assessing welfare of shelter cats and then apply it in different Slovenian animal shelters. The protocol, based on a variety of scientific literature and on existing animal welfare protocols, as well as on the Five-Domains Model was developed and then tested in 5 Slovenian animal shelters. It includes resource-, management-, and animal-based measurements at three levels of assessment: at shelter level, at the pen level and at the individual (i.e. the single cat) level. The welfare assessment was conducted primarily through visual distance observation. The development and proposal of such a protocol, which can be used not only in animal shelters but also in other environments, is important in order to improve and positively influence welfare of cats. The study also describes the main limitations of the proposed protocol and ideas for future improvements.

Keywords: Cat Welfare/Welfare protocol/Welfare assessment/Animal shelters

Die Gewährleistung des Wohlergehens von Tieren ist heutzutage von größter Bedeutung und wird zu einem wichtigen Bestandteil der verschiedenen Umgebungen, in denen Tiere gehalten werden. In den letzten Jahren konzentrierten sich Tierschutzbewertungen zunächst nur auf Arten wie Rinder, Hühner, Pferde, Esel, Puten, Schweine, Ziegen und Schafe. Das Bewusstsein für das Wohlergehen anderer Tierarten, wie zum Beispiel Katzen, war früher viel trivialer, wird aber heutzutage immer wichtiger. Katzen werden als Haustiere immer beliebter. Daher ist es wichtig sicherzustellen, dass Katzen eine Umgebung haben, die ihrem Wohlbefinden förderlich ist. Das Wohlergehen der Katze ist auch in Tierheimen von größter Bedeutung, in denen Katzen oft verschiedenen Stresssituationen ausgesetzt sind. Um jedoch das Wohlergehen von Katzen in Tierheimen zu beurteilen, ist ein spezielles Protokoll für eine solche Beurteilung notwendig. Es gibt mehrere Protokolle zur Bewertung des Tierschutzes, die auf dem Konzept der Multidimensionalität basieren, physische Parameter und Parameter, von denen angenommen wird, dass sie den mentalen Zustand des Tieres widerspiegeln, einschließlich eines Protokolls zur Bewertung des Wohlergehens von Hunden in Tierheimen. Da es derzeit keine Standardisierung das Wohlergehens von Katzen in Tierheimen zu bewerten, war das Hauptziel dieser Studie, ein umfassendes Protokoll zur Bewertung des Wohlergehens von Tierheimkatzen zu entwickeln und es dann in verschiedenen slowenischen Tierheimen anzuwenden. Das Protokoll, das auf einer Vielzahl von wissenschaftlicher Literatur und bestehenden Tierschutzprotokollen sowie auf dem Fünf-Domänen-Modell basiert, wurde entwickelt und dann in 5 slowenischen Tierheimen getestet. Es umfasst ressourcen-, management- und tierbasierte Messungen auf drei Bewertungsebenen: auf Tierheimebene, auf Aufbewahrungsebene und auf individueller Ebene (d. h. der Einzelkatze). Die Beurteilung des Wohlbefindens wurde hauptsächlich durch visuelle Distanzbeobachtung durchgeführt. Die Entwicklung und der Vorschlag eines solchen Protokolls, das nicht nur in Tierheimen, sondern auch in anderen Umgebungen verwendet werden kann, ist wichtig, um das Wohlergehen von Katzen zu verbessern und positiv zu beeinflussen. Die Studie beschreibt auch die wichtigsten Einschränkungen des vorgeschlagenen Protokolls und Ideen für zukünftige Verbesserungen.

Schlüsselwörter: Wohlergehen der Katze / Wohlfahrtsprotokoll / Wohlfahrtsbewertung/ Tierheime

1.   INTRODUCTION

In recent years, the number of cats in households has increased, making them popular pets (Toribio et al., 2009). At the same time, the number of shelter cats has also increased, with the goals of trying to reunite owners with lost pets, rehoming animals not in their possession, and providing shelter and care to at-risk animals (Turner et al., 2012).

1.1 Welfare of cats in *shelters*

Animal shelters are spatially and socially diverse (community of different individuals such as cats and dogs, that have different characteristics and personalities) and cats there are exposed to many situations, such as new situations, interacting with unfamiliar people and in addition they are kept in confined spaces (Bradshaw & Casey, 2007). Interestingly, cats appear to be in a worse position to be adopted because they spend a longer time in the shelter compared to dogs, which increases their exposure to stressful situations and consequently negatively affects their overall well-being (Vojtkovska et al., 2020). By definition, animal welfare represents both the physical and mental well-being of the individual and includes not only the condition of the animal's body, but also its emotions (Hewson, 2003). Dawkins (2021) defines animal welfare as a state condition where an animal is both healthy and has what it wants. Moreover, according to Broom (1988) animal welfare can range from good to poor and he defined as a condition of an individual animal in relation to its attempts to cope with its environment. When these conditions become difficult in their natural environment, animals develop mechanisms to cope with the problems they are likely to encounter (Kessler & Turner, 1997).

Despite the best intentions and selfless efforts of numerous dedicated individuals working in animal shelters, there are many animal welfare issues associated with the care and management of these animals (Turner et al., 2012). Since there are many stressful environmental and social conditions in the facilities where animals are temporarily housed, everyone should work to minimise the animals' stay there (Vojtkovska et al., 2020). Other incredibly stressful events for cats include different daily housing routines, daily change of volunteers, unpredictability of

staff, veterinary treatments and surgeries, presence of other animals, loud noises, inappropriate cage size, etc. The more frequently these negative factors occur, the more likely the welfare of shelter cats will be compromised (Burns et al., 2020).

The cat welfare is influenced not only by their physical environment and housing conditions, but also by the way they are handled, because during daily cleaning and care, cats have the opportunity to interact and communicate with various familiar or unfamiliar people, such as shelter managers, shelter caretakers, veterinarians, volunteers, and potential adopters. (Rochlitz, 1999). How people interact with the cats, what handling techniques are used, what hygiene protocols are followed, and how they communicate with the cats and their tone of voice is extremely important (Gourkow & Fraser, 2009). Another Gourkow's (2014) study has shown how consistent, positive, calm, and gentle interactions with cats lower their stress levels and thus improve immune system function as petting increases their immunoglobulin A (IgA). However, there are many individuals who work at animal shelters, such as volunteers, who have little background or training in population management, including infectious disease detection and control. In addition, veterinarians who wish to volunteer or work in animal shelters have a responsibility to educate themselves about the special needs of this animal population to ensure that the best and most appropriate medical care is provided. To ensure the welfare of the animals, all shelter staff and volunteers must be properly trained and educated (Turner et al., 2012). The care and welfare of cats in shelters therefore presents unique challenges, particularly because the proper management of cats in shelters requires an understanding of the wide range of feline lifestyles and an approach tailored to the individual needs of each group (Griffin, 2017). Reducing the stress cat's face in shelters would likely improve their welfare and compatibility, increasing their potential for adoption and possibly improving their behaviour in the post-adoption period (McCobb et al., 2005).

Assessing the welfare of cats can help improve the quality of the environments in which they are housed. Therefore, it is of great importance to be able to assess the welfare of cats in shelters or in other different environments. For cat welfare assessment to be effective and acceptable to all stakeholders, it must include measures that are relevant to animal welfare, practicable, reliable, and require minimal resources and staffing (Dunston-Clarke et al., 2020). Increasing efforts are being made worldwide to develop objective indicators for evaluating animal welfare

that provide information about animal welfare (valid), are scientifically trustworthy and accurate (reliable), and can be easily applied by professionals in practice (practical). (Wemelsfelder & Mullan, 2014).

1.2 Welfare assessment protocols

The most common and well-known existing animal welfare protocols are the Welfare Quality® Protocols (2009), which integrate a number of different indicators (Blokhuis et al., 2010). Another is the Shelter Quality Protocol for Assessment of Shelter Dog Welfare (Barnard et al., 2016), as well as protocols from the Animal welfare indicators project (AWIN), which cover various animal species such as horses (Minero, Dalla Costa, et al., 2015), turkeys (Ferrante et al., 2015), donkeys (Minero, Costa, et al., 2015), goats (Mattiello et al., 2015), and sheep (Dwyer et al., 2017). Aforementioned welfare assessment protocols are mostly developed and based on the Five Freedoms, an animal welfare model that consist of: freedom from hunger and thirst; freedom from discomfort; freedom from pain, injury or disease; freedom to express normal behaviour; freedom from fear and distress (Society for the Prevention of Cruetly to Animals, 2020). In addition, a new animal welfare model was developed by Mellor and others (2020), known as the Five Domains Model (**Fig. 1**) and can be applied to all animal species and it represents the basis of setting norms of animal welfare. These two welfare models both contain essentially the same five elements, however, the Five Domains (Mellor et al., 2020) have greater focus on the mental state of an animal (how the animal 'feels') and acknowledges that welfare can be both positive and negative. Therefore, it focuses on the idea on meeting animal basic needs but also on their emotional states and emotional needs, as the additional fifth domain enables an ultimate assessment of the overall welfare state of the animals, understood in terms of what they were likely to experience subjectively (Padalino & Menchetti, 2021).

The Five Domains Model
Physical/Functional Domains

Survival-Related Factors | *Situation-Related Factors*

1: Nutrition | **2: Environment** | **3: Health** | **4: Behaviour**

Restrictions on:	*Opportunities to:*	*Unavoidable/imposed conditions:*	*Available conditions:*	*Presence of:*	*Little or no:*	*Exercise of 'agency' impeded by:*	*'Agency' exercised via:*
Water intake	Drink enough water	Thermal extremes	Thermally tolerable	Disease: acute, chronic	Disease	Invariant, barren environment (ambient, physical, biotic)	Varied, novel, engaging environmental challenges
Food intake	Eat enough food	Unsuitable substrate	Suitable substrate	Injury: acute, chronic; husbandry mutilations	Injury	Inescapable sensory impositions	Congenial sensory inputs
Food quality	Eat a balanced diet	Close confinement	Space for freer movement	Functional impairment: due to limb amputation;	Functional impairment	Choices markedly restricted	Available engaging choices
Food variety	Eat a variety of foods	Atmospheric pollutants: CO_2, ammonia, dust, smoke	Fresh air	or lung, heart, vascular, kidney, neural or other problems		Constraints on environment-focused activity	Free movement
		Unpleasant/strong odours	Pleasant/tolerable odours				Exploration
Voluntary overeating	Eating correct quantities	Light: inappropriate intensity	Light intensity tolerable	Poisons	Poisoning		Foraging/hunting
Force-feeding		Loud/otherwise unpleasant noise	Noise exposure acceptable			Constraints on animal-to-animal interactive activity	Bonding/reaffirming bonds
				Obesity/leanness	Body condition appropriate		Rearing young
		Environmental monotony: ambient, physical, lighting	Normal environmental variability				Playing
				Poor physical fitness: muscle de-conditioning	Good fitness level	Limits on threat avoidance, escape or defensive activity	Sexual activity
		Unpredictable events	Predictability			Limitations on sleep/rest	Using refuges, retreat, or defensive attack
							Sleep/rest sufficient

Affective Experience Domain
5: Mental State

Negative	*Positive*	*Negative*	*Positive*	*Negative*	*Positive*	*Negative*	*Positive*
Thirst	Wetting/quenching pleasures of drinking	Forms of discomfort:	Forms of comfort:	Breathlessness	Comfort of good health and high functional capacity	Anger, frustration	Calmness
Hunger (general)	Pleasures of different tastes/smells/textures	Thermal: chilling, overheating	Thermal	Pain: many types		Boredom, helplessness	Engaged, in control
		Physical: joint pain, skin irritation		Debility, weakness		Loneliness, isolation	Affectionate sociability
Hunger (salt)	Pleasure of salt taste	Physical: stiffness, muscle tension	Physical	Sickness, malaise			Maternally rewarded
	Masticatory pleasures	Respiratory: e.g. breathlessness		Nausea		Depression	Excitation/playfulness
Malnutrition malaise	Postprandial satiety	Olfactory	Respiratory	Dizziness		Sexual frustration	Sexual gratification
		Auditory: impairment, pain	Olfactory				
Bloated, over full	Gastrointestinal comfort	Visual: glare/darkness eye strain	Auditory	Physical exhaustion	Vitality of fitness	Anxiety, fearfulness, panic, anger	Secure/protected/confident
Gastrointestinal pain			Visual			Neophobia	Likes novelty
		Malaise from unnatural constancy	Variety-related comfort			Exhaustion	Energised/refreshed

Welfare Status

Figure 1: The detailed elements of the Five Domains Model. Adapted by Mellor et al., 2020.

Mellor et al. (2020) suggest not only to focus on each domain as an individual domain, but on all five domains altogether, as they intertwine and form a whole. Together they all affect one's wellbeing, as they draw attention to areas that are relevant to welfare assessments and their primary purpose is to provide examples of some internal states or external circumstances that animals may encounter and the aligned negative and positive affects that may arise in many species (Mellor, 2016). In order to achieve optimal states of these domains certain criteria must be met, on which the assessment of welfare is usually based. Since merely minimising or resolving negative physical or mental states does not necessarily result in positive welfare, but may only provide, at best, a neutral state, animals need more than this, to have good welfare (Mellor et al., 2020). As Mellor et al. (2020) state, it is important to recognize their subjective emotional needs, not just meeting their basic needs. However, there is currently no protocol for assessing welfare of cats. Although there are many different useful and applicable methods for welfare assessment of cats in shelters, focusing on behavioural, physiological, and health indicators, there is no comprehensive cat welfare assessment protocol that includes both animal-based and resource-based measures for assessing cat welfare (Vojtkovska et al., 2020). As

suggested by Padalino and Menchetti (2021), such a standardised protocol could be used to assess individual resources (diet, housing), compare different housing systems, quantify a range of optimal welfare measures and assess compliance by animal caretakers, develop quality certifications, identify risk factors of cat welfare and provide evidence for the development of new animal welfare legislation.

The main objective of the study was to develop a comprehensive protocol for assessing welfare of shelter cats and then appy it in various Slovenian shelters. The more specific goals of our research were to evaluate and test the protocol at the shelter-wide level, at the pen level, and at the individual level (i.e. the single cat), and to refine the protocol after fieldwork in the shelters to assess which assessment methods are appropriate and which are not.The main limitation of the study was sample size. The protocol provides a comprehensive tool for individuals to assess the condition of the environment in which cats live and, based on this, to improve their environment and thus influence the welfare of cats. It was developed and based on the Five Domains Model and consists of five main domains such as nutrition, environment, health, behavior, and mental state. In total it combines 24 different methods and tools for a more comprehensive and accurate assessment of cat welfare, using both the medical/veterinary methods and non-invasive and quick-to-record behavioural observation methods.

2.   MATERIALS AND METHODS

2.1 Study design

The study consisted of a theoretical and a practical part. The theoretical part involved the development and design of the Welfare assessment protocol for shelter cats (**Appendix 1**). It included familiarisation with the concepts of other existing animal welfare protocols, because if the theoretical framework had not been developed, then it would not have been possible to carry out the practical work. The practical part involved the application of the first version of the protocol and assessment in different Slovenian animal shelters that we have visited and which agreed to participate and conduct the study (**Appendix 2**). The application of the first version of the protocol and therefore data collection helped us to refine and develop the final

version of the protocol. Through the refinement process some new methods were added, some were excluded, and some were adjusted to be the most practical and useful for the assessment. Finally, statistical analysis of data for certain assessment methods was performed and qualitative comparison between shelters was made.

2.2 Welfare protocol development

The protocol for shelter cats was developed and is based on a recently introduced animal welfare model known as The Five Domains Model, briefly outlined above. The model examines an animal's psychological state in more detail and recognises that for every physical condition of an animal known to be affected, there may be an accompanying emotion or subjective experience that may also impact welfare (RSPCA, 2019). The protocol was developed in consultation with three veterinarians, two shelter managers and an animal behaviourist, and with the help of shelter caretakers. The development process of the protocol took place at the University of Ljubljana. It included several online meetings with the external supervisor and face-to-face meetings with shelter managers (n=5), where they worked together to develop the protocol step-by-step. The development of the first version of the protocol took place between October 2020 and September 2021. In May 2022, selection of appropriate assessment methods was additionaly done with the help of the shelter manager of animal shelter Ljubljana. The protocol descriptions, definitions and parameters were based on the theoretical and practical knowledge of the authors of the shelter protocol and modified with the help of other literature, such as scientific papers published in international journals, reviews and veterinary textbooks. In developing the protocol, we also drew on other existing protocols such as the Welfare Quality® Protocols (Welfare Quality® Project, 2009), the Shelter Quality Protocol for Assessment of Shelter Dog Welfare (Barnard et al., 2016), and the protocols from AWIN protocols for the assessment of horses (Minero, Dalla Costa, et al., 2015), turkeys (Ferrante et al., 2015), donkeys (Minero, Costa, et al., 2015), goats (Mattiello et al., 2015), and sheep (Dwyer et al., 2017). In addition to the protocols listed above, some of the already existing assessment methods such as Feline Spectrum Assessment Score (American Society for the Prevention of Cruelty to Animals, 2017), Quality of Life Assessment (International Cat Care,

2020), Feline Grimace Scale (Evangelista et al., 2019), Cat Approach Test (Arhant & Troxler, 2019) and Cat Stress Score (McCune, 1994) were included in the protocol, based on the recommendations of Vojtkovska et al. (2020). In addition, the review by Vojtkovska (2020) was mainly used to guide a selection of assessment methods for the protocol, as the authors of the review focused on methods and tools developed for assessing the welfare of cats in animal shelters.

The protocol is divided into 5 main parts: general information about the welfare of cats, description of the protocol and information about its application, the measurements of the protocol at three main levels (shelter level, pen level and individual cat level), samples of the information and the assessment process, appendices (scoring sheets). The protocol combines animal-based as well as resource-and management-based measurements. The protocol measurements, integrated into three main levels of assessment as seen in **Tab. 1**, were carefully reviewed and selected from a wide range of literature such as the animal welfare protocols mentioned above, as well as studies, most of which were journal articles, sourced from expert platforms such as PubMed, Research Gate, Google Scholar, and Web of Science. Measurements which could cause unnecessary stress were excluded from the protocol (blood sampling, direct assessment of blood pressure, heart rate, respiratory rate and rectal temperature). Therefore, we included practical, easy-to use, and most importantly, less or non-invasive assessment methods.

Table 1: Measurements at three main levels (shelter, pen, and individual, i.e. single cat level).

SHELTER LEVEL	**General information** **Social housing: types of accommodation** **Health: Surgeries and control of pain** **Mortality** **Morbidity** **Feeding**
PEN LEVEL	**Space allowance** **Environmental optimisation and availability of the resources** **Water and Food supply**

INDIVIDUAL LEVEL	**Interaction with humans** **Emotional states and presence of stress** **Quality of life** **Hypothermic and hyperthermic behaviours** **Diarrhea** **Body condition** **Muscle condition** **Coat condition** **Skin condition** **Eye, nose and ear discharge** **Respiratory disorders** **Sickness behaviours** **Pain assessment**

2.3 Application of the protocol in the cat shelters and sample size of cats

Overall, the total number of cats assessed was 74 (**Tab. 2**). This is sufficient and in line with the Shelter Quality Protocol for Assessment of Shelter Dog Welfare (Barnard et al., 2014) recommendations, which we have adapted to our protocol instructions (**Appendix 1, page 86**) in relation to the sample size. The instructions state that a minimum of 30 cats and 6 pens should be included in the assessment (in an individual shelter) in order to obtain reliable data and the selection of pens for assessment in larger shelters should be randomised using any online research randomization programme.

Additionaly, our protocol states that the assessment of cats should depend on the actual number of cats in the shelter on the day of the assessment and it should be adjusted accordingly. Therefore, if only a small number of cats (n=10) was housed at the shelter on the day of the visit, all cats were assessed to increase the number of cats assessed. In addition, all age categories of cats (kittens, juniors, primes and senior cats) were included in the study, as were cats of all sexes, cats in stable health, well socialised cats, neutered or spayed cats and cats housed in quarantine if the assessor had access to that area. However, although a total of 74 cats were assessed, the number of cats assessed varied between the different assessment methods

(Cat Stress Score, Frustration Scale, Body Condition Score (BCS) and coat condition), due to certain constraints (inaccessibility of cats, hiding of cats, movement and transition of cats from group housing to outdoor area). Therefore the number of cats assessed was adjusted according to the assessment method.

2.4 Data collection on three main levels

The practical part, i.e., the observational assessment, was performed by a female person, i.e. the author of this study, who is trained and educated in animal welfare, focusing on cat behaviour. The first version of the protocol for shelter cats was implemented in 5 Slovenian animal shelters from April to June 2022. Our goal was to reach more than 15 shelters, however we encountered difficulties in finding shelters that would house more cats at the time of the survey. In addition, the reasons why shelters did not want to take part in the survey was either due to the COVID-2019 restrictions to limit the spread of the disease, or they did not provide any specific arguments. Therefore, shelters that were not willing to cooperate (n=7) because of the previously mentioned reasons, or housed only a very small number of cats (n=3), were not included in the study. This caused us to be somewhat limited and prevented us from performing a solid and complex statistical analysis of the data collected. Prior to conducting the assessment, shelter managers were given the full protocol and informed of the assessment plan, which included information on the approximate duration of the assessment, schedule and activities and type of measurements (animal-based and resource-based). Prior to visiting the shelter and conducting the assessment, the assessor was also provided with general information about the shelter and how it operates in relation to the veterinary regulations. The full assessment was performed in a single day and took between 3 and 6 hours, depending on the size of the shelter and the number of cats housed in the shelter on the day of the assessment (**Tab. 2**). As shown in the table below (**Tab. 2**), the number of cats assessed was much lower than the actual number of cats placed in animal shelter on the day of our visit. As mentioned above **(page 7)**, not only that the number of cats assessed varied between the different assessment methods (Cat Stress Score, Frustration Scale, Body Condition Score and coat condition), but some of the cats were

either in quarantine (where we had no access) or in a veterinary clinic at the time of our assessment.

The assessment not only helped us to collect data, but it helped to identify methods that would be useful for the final version of the protocol. Therefore, the assessment in shelters helped to refine and develop the final version of the protocol. Some methods which (when performing the assessment) have proven to be practical and useful for the assessment were added and those that were not, were excluded. Lastly, statistical analysis of the data and presentation of findings was performed.

Table 2: The number of cats in Slovenian animal shelters on the day of the assessment and the actual number of cats assessed on the day of the assessment.

Animal shelter	Number of cats on the day of assessment	Number of cats in the quarantine on the day of the assessment	Total number of cats assessed
1	35	/	13
2	40	8	8
3	16	10	6
4	60	9	23
5	50	8	24
Total	201	35	74

2.4.1   At shelter level

At the beginning of the assessment, the questionnaire on general information about the shelter, social housing, mortality and morbidity, and shelter costs was completed with the shelter manager or caretakers (see **Appendix 1, page 146–149**). No visual contact or direct contact

with the cats was made during the shelter assessment. The questionnaire consisted of 31 questions, of which 4 were closed questions and the remaining 27 were open questions.

2.4.2   At pen level

The shelter level assessment was followed by the pen level assessment in which the assessor stood at a distance of 2 meters in front of the pen, or as far as it was necessary to make the goods present visible (**Fig. 2**).

Figure 2: Presence of different resources available to the cat in each pen.

As **Fig. 3** shows, cats were visually assessed using scoring sheets from the protocol. Because cats can be frightened by rapid and unexpected movements or even by inappropriate clothing, the assessor used cat-friendly approaches and stood calmly and quietly in the room during the assessment, dressed in neutral colors (blue, black or gray; as most of the colors appear to them

as they can see blue very clearly but other colors appear as shades of gray). During the assessment, the cats were housed in their usual environment, i.e., their pens or in group housing, if such a form of housing was available at the shelter. During the assessment at the individual level, the assessor inserted short breaks that additionally allowed the cats to remain calm and reduce any existing level of stress.
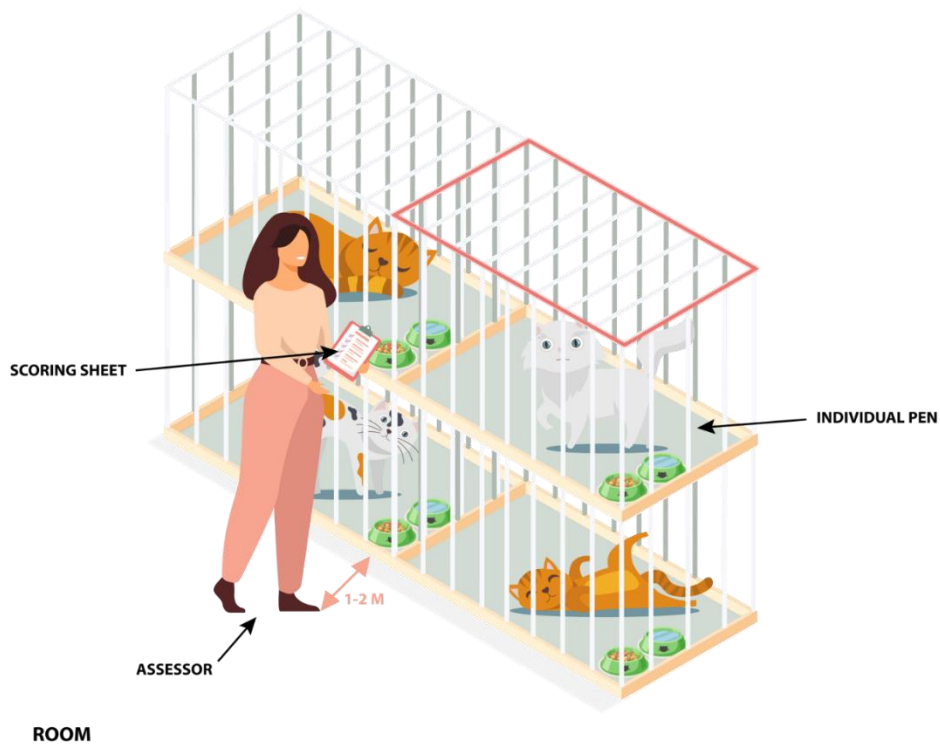
Figure 3: Demonstration of the assessment procces at the pen level assessment.

The assessment was related to the type of housing (individual or group), the pen dimensions (length, width, height), the presence of doors and the possibility for the cats to enter the outdoor area, environmental optimisation of shelter (**Fig. 4**) and the availability of resources for the cats, the presence, number and material of food and water bowls, and the temperature of the environment. We have asked shelter managers to provide the appropriate dimensions of each pen.

Figure 4: An example of environmental optimization including tunnel, hiding and resting places that are part of the wooden structure in the centre of the picture.

2.4.3   At individual level (i.e. single cat level)

The pen level assessment was then followed by assessment at individual level i.e., individual cat level. The cats were observed visually and assessed by the assessor using scoring sheets from a distance of approximately 1-2 m, in order to not scare the cats. The assessment was performed inside of the individual pen, if the assessor was allowed by the shelter manager. If it was not possible to see the whole cat, these cats were not scored (n=10). Assessment methods of the protocol such as Feline Spectrum Assessment Score, Quality of Life Assessment and Karnofsky Scale were not used by the assessor becasue they are intended only for shelter caretakers or veterinarians. Assessment methods such as pain assessment, sickness behaviours and Feline Grimace Scale, used to assess the presence of pain and disease, were not used by the assessor because she was not allowed to enter the quarantine area. Shelter managers refused to allow entry into quarantine area, as they did not have adequate equipment to prevent the

transmission of the disease. The level of socialisation of an individual cat was assessed using the Cat Approach Test, a modified version proposed by Arhant and Troxler (2017), which is based on a two-step assessment: the assessor appoached the individal pen and attempted to make contact with the individual cat. The same was done in the group housed environment. If the cat clearly signalled that it wanted to make contact, the assessor offered a hand to the cat (according to the test instructions) and calmly waited for the cat's next response (walking away, rubbing the surface, rubbing the assessor's hand, sniffing …). If the cat reacted anxiously and indicated that it wanted to retreat, the assessor responded accordingly and increased the distance or left the pen and continued the assessment in front of the pen, but only after the cat returned to a calm state. In addition, our version of this observational method **(Appendix 1, page 161)** also included information about the material of each pen, as the type of the pen material (glass, wire, no barrier**, Fig. 5)** may influence the interaction between the animal and the assessor (Mancini et al., 2014).

Figure 5: Example of glass kennel door of an individual pen.

Stress levels were assessed using two different observational methods. One was the Cat Stress Score, which was used to assess the position of 9 different body parts (whole body, abdomen, tail, head, eyes, pupils, ears, whiskers), and vocalizations and activity of each cat (**Appendix 1, page 164–167).** The 7-point rating system was developed by Kessler and Turner (1997) based on the Cat Assessment Score (McCune, 1994) and measures the presence and degree of stress in cats and their different behaviours in different situations (Vojtkovska et al., 2020). The assessor used the expended version of McCune's (1994) Cat-Assessment-Score and scored each cat once rather than four times per day as in the original study (Kessler & Turner, 1997). The assessor was placed two meters in front of the pen in a quiet position so that each cat would become accustomed to the presence of the assessor. The assessor then observed the cat for approximately one minute and recorded the data continuously.

The second method used for assessing the presence of stress was the Frustration Scale, developed by Fear Free Shelters (2021). As shown in **Tab. 3,** the Frustration scale assesses 6 levels of stress (from lowest to highest signs of stress), with each of these levels representing active or passive signs of stress (Fear free shelters, 2021). If the cats fell asleep during the assessment, they were not disturbed or awakened for the purposes of assessment (n=7). The assessor then stood in a quiet position in front of the pen and visually assessed the thermal comfort of each cat and the presence of diarrhea or liquid feces. The assessor noted any signs of hypothermia or hyperthermia, the time of year (spring, early summer) was noted as we can make a correlation between the time of year the assessment takes place and the signs (hyperthermia or hypothermia) that may be present. The assessor should be as far away as necessary to detect the presence of the liquid feces. Eye, nasal and ear discharge, and respiratory symptoms were noted in the same manner by observation.

Table 3: Adapted Fear Free Shelters (2021) Frustration scale which represents 6 levels of stress; from highest to lowest signs of stress.

HIGH SIGNS: LEVEL 5	Severe signs of FAS (either **ACTIVE** or **PASSIVE**) with either: - **OFFENSIVE AGRESSION** (pupils are dilated or constricted, cat is leaning forward, ears are forward, whiskers are forward, tails is an inverted L (first inch of tail is horizontal with ground then the tail drops down), cat may be growling or biting) - **DEFENSIVE AGRESSION** (pupils are dilated, ears are back, tail is tucked or it might be trashing, whiskers are back, cat might be hissing and staring, brows are furrowed and lips are pulled back, cat might be swatting)
ACTIVE	High arousal, hissing, aggression, repetitive meowing and pacing, pawing, pushing or hanging on the cage, escape behaviours, disruption of cage contents. Fight, freeze or flight response.
PASSIVE	Hiding, feigning sleep or not moving, hypervigilance, avoiding social interactions, decreased play, under grooming or over grooming, decreased appetite, little to no interest in reinforcers (toys, treats, attention).
HIGH SIGNS: LEVEL 4	Severe signs of FAS without aggression, however cat might: - **FLIGHT:** Cat might actively try to escape, pupils are dilated, ears are back, whiskers are back, tail is down and bottle brushed, a cat might turn to look at stimulus. - **FREEZE/FRET:** Cat might be immobile (tonic immobility) or trembling , pupils are dilated, body is flattened and tense, tail is tucked, respiratory rate is increased, ears and whiskers are back, cat might be staring. Cats may not accept reinforcers and are not interested in interactions.
MODERATE SIGNS: LEVEL 2–3	Signs of FAS might occur such as: - **MILD (Level 2):** 1 or 2 mild signs of FAS. These signs occur less than 4 times a minute. Cats might readily accept reinforcement (treats, toys, attention) and is soliciting in social interactions. - **MODERATE (Level 3):** 2 or more moderate signs of FAS that occur more than 4 times a minute. May refuse reinforcements for brief moments, might take treats roughly at times. Hesitance to interact with others, but not actively avoiding them. - **SIGNS:** Ears slightly back or to the side, pupils are not completely dilated, respiratory rate is increased, brows are furrowed, tail down or tight to the body, whiskers are back, slow movements or overly attention seeking.
LOW SIGNS: LEVEL 0–1	Cats might show: - **NO SIGNS (Level 0):** Cat has a relaxed body posture and shows normal social contact and normal behavioural patterns, friendly behaviour, normal eating behaviour, normal grooming behaviour, normal play behaviour, normal sleeping and resting behaviour. Cat readily accepts reinforcers (treats, toys,...). - **MILD SIGNS (Level 1):** Cat might be relaxed or shows mild signs of FAS (lip licking, avoiding eye contact, turning head away without moving away, partially dilated pupils. These signs occur less than 4 times a minute.

The assessment of body, coat and skin condition was performed in combination with the Cat Approach Test because of its better feasibility, since in this test the cat indicated whether it wanted to make contact or not. However, direct contact with each individual cat was only performed only if the assessor was allowed to enter each pen. If the cat withdrew, the assessment was conducted only by observation in front of the pen, without entering the pen. At all times, the assessor observed the body language and reaction of each cat so that she could respond appropriately and quickly. In this way, the assessor allowed the cat to withdraw, thus reducing its level of stress.

2.5 Statistical analysis

The statistical analysis of the study included the desriptive analysis, such as mean and frequencies (only for certain observational assessment methods such as Cat Stress Score, Frustration Scale and Body Condition Score), while the data from other observational assessment methods was presented and interpreted mostly through describing.

3. RESULTS

3.1 Protocol development and use

At the beginning of the study, the first version of the protocol, based on a variety of scientific literature and on existing animal welfare protocols, as well as on the Five-Domains Model (nutrition, environment, health, behavior, and mental state) was developed. The development of the protocol was followed by application of the first version of the protocol in 5 Slovenian shelters, where data were collected using observation forms (scoring sheets), which can be found in the last section of the protocol (**Appendix 1, page 146–149**). Data collection of this pioneer assessment not only helped to refine and develop the final form of the protocol, but also helped us to test whether the protocol is applicable and useful. All required measurements were taken using non-invasive methods and in a timely manner. The time required to assess cats in an individual pen varied between 5 and 10 minutes, depending on the size oh the shelter and the number of cats on the day of the assessment.

3.2 Cat welfare assessment

3.2.1 At shelter level

The questionnaire consisted of 31 questions, of which 4 are closed-ended and the remaining 27 are open-ended questions, and was completed with the shelter manager or shelter caretakers. In addition, information about feeding and general information about each shelter was collected. Debriefing of the general information and feeding schedule with the shelter manager took between 5 and 10 minutes. As shown in the table below **(Tab. 4)**, the number of caretakers varied from 4 to 9 caretakers per shelter. In all shelters, the caretakers were well educated and trained. In two of the 5 shelters, the managers were veterinarians (shelters 2, 4). All shelters had animal checklists **(Fig. 6)** in which all relevant information about each cat was recorded, but only in shelter 4 were these records kept in the office rather than where the cats were housed.
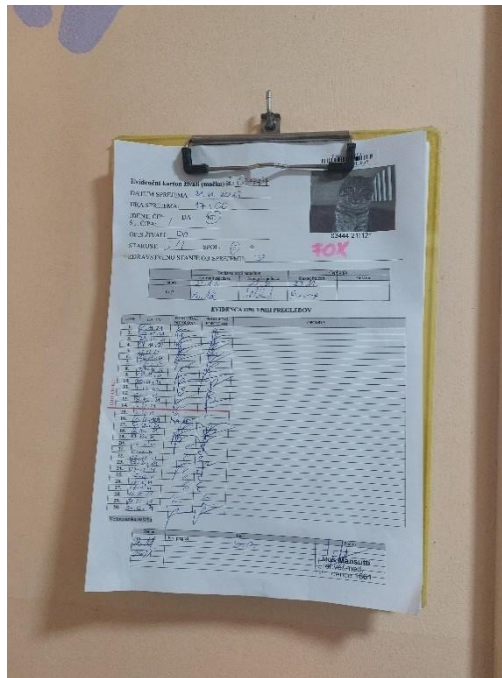
Figure 6: Animal checklist and relevant information of each cat.

At shelter 2, according to the manager, they were in the process of adding the records in digital form to the Vetpantheon system. All shelters had a 4-hour response time (according to the shelter law), but mostly they responded as quickly as possible, specially if an animal was injured. If it is a found animal, they have 24 hours to respond, but they try to work with the finders to provide temporary help, care, or a home for the cat. Almost no shelter had a working system where the caretaker was responsible for a certain number of cats. As shown in **Tab. 4,** the number of individual pens varied among the shelters. In shelter 1, no specific information was provided on the total number of individual pens. Each individual pen had an outdoor area, and there was an additional outdoor area (40 m^2) for the cats in group housing. In shelter 2, there were a total of 120 pens, 40 of which in a cat-only facility. Of these 40, 20 were inside of the individual pens and 20 were outside of the individual pens. On the day of the assessment, we counted 24 quarantine pens, but the shelter adjusted the number of quarantine pens to the number of cats. No cats were housed in groups. In shelter 4, where cats were mostly housed in groups, there were 5 individual pens, but only for receiving the cats or as quarantine. In shelter 3, there was no outdoor area. In shelter 4, only feral cats roamed freely in the outdoor area, while other cats were housed indoors. In shelter 5, 2 large outdoor areas were assessed. In 3 of

5 shelters, no information on maximum group size was provided. In all shelters, cats and dogs were housed separately, but only in shelters 2 and 3 was there a sound barrier to reduce noise transmission from barking dogs.

Table 4: General information about shelters

Animal shelter	Cats (N)	Cats assessed (N)	Caretakers (N)	Training of caretakers	Animal checklist	Response time	Pens (N)	Individual pens (N)	Outdoor areas (N)	Group housing (N)	Hospitalised pens (N)	Maximum group size	Separate housing (dogs/cats)	Sound barrier
1	35	13	9	Yes	Yes	4h	/	13	14	1	12	15	Yes	No
2	40	8	8	Yes	Yes	4h	120	20	20	/	24	/	Yes	Yes
3	16	6	4	Yes	Yes	4h	10	10	/	2	10	12	Yes	Yes
4	60	23	5	Yes	Yes	4h	5	5	1	8	5	/	Yes	No
5	50	24	/	Yes	Yes	4h	/	/	2	3	9	/	Yes	/

In shelter 2, the animals were housed separately, with the dogs in one facility and the cats in another, separated by a running track in the middle (**Fig. 6**). In shelter 3, the cats were housed in the same building as the dogs, but the pens had double doors that acted as sound barriers.

Figure 7: Example of the floor plan of a shelter.

All shelters had hospital pens, standardized operating procedures for postsurgical monitoring (health therapy, daily monitoring, analgetics) and protocols for analgesia, prescribed on the orders of a veterinarian. All shelters used tools to reduce stress (such as cardboard boxes to hide cats) and relieve pain after surgical procedures, such as thermophores, and warm, enclosed beds. All shelters are euthanasia-free shelters, meaning no cat was euthanised for behavioural or other reasons. Only cats with serious health problems that are difficult to treat were euthanized. However, only 3 shelters provided data on the number of euthanased cases in the last 12 months. In 2021, 114 cats were euthanized at shelter 1 and 101 cats were euthanized at shelter 3. Neither shelter provided specific information on the reasons for euthanasia. In 2021, 284 cats were euthanised at shelter 1. 70 of them were euthanized due to feline diseases AIDS, which represented almost 25 % of all euthanized cats. 39 cats were euthanized due to trauma

or severe injuries, accounting for almost 14 % of all euthanasia cases. Two cats were euthanized due to microsporiasis because treatment was not possible. According to the shelter manager, the number of leukosis cases had increased, due to the intake of cats from other, mainly more rural, municipalities. A total of 38 cats were euthanized due to leukosis. 61 cats were euthanized due to other diseases, especially geriatric diseases (kidney failure). Only two shelters (3 and 4) provided information on total expenditures for medical treatments in the last 12 months, which amounted to 12–13,000 EUR in shelter 3 and 40–41,000 EUR in shelter 4.

After completing the questionnaire on general information about the shelter, the questionnaire on the feeding the cats (**Appendix 1, page 146–149**) was completed, which included several questions on the type of diet, how the diet was adapted to the cats' needs, information on how many times a day the cats were fed and who specifically fed them, and how the food was stored in the shelters. All the shelters fed mainly dry food (briquettes) and wet food (canned or bagged). In 2 of 3 shelters (1, 3), the cats were also fed a mixture of different briquettes, as most of the food came from donations and, therefore they did not always receive the same brand of dry food. In shelters 2 and 4, the main brand of dry food was Royal Canin, while in shelter 5, Orien was used as the main brand of dry food. In all shelters, there was a food adapted to the needs and age of the cats (kittens, adult, elderly, sick, nursing cats). In shelter 3, food for hospitalised cats was ordered separately, directly from the veterinary clinic. In all 5 shelters, dry food was available to cats at all times (*ad libitum*), while wet food was fed once or twice per day, according to caregivers, unless kittens were fed at least 3 times per day. In 3 of the 5 shelters, cats were fed only by staff, while in 2 shelters (1, 5) they were also fed by volunteers, but at the instructions of staff. All shelters stored dry food in suitable sealed containers, whereas wet food was stored in the refrigerator, but only in summer, as in winter, when the cats' appetite increases, enough of it is consumed and therefore it does not need to be stored in the refrigerator.

3.2.2   At pen level

As seen in **Table 5** dog pens housed more than one cat because the dimensions were larger and offered more space. In 8 smaller individual pens cats had access to the outside area through a

small door. The exact number of cats in the group housing could not be recorded because the cats were constantly going outside, they hid or were examined by a veterinarian.

In shelter 2, eight individual pens were assessed a total interior area of 1.45 m^2 and a total exterior area of 2.06 m^2. All individual pens were 2.43 m high. One cat was housed per individual pen, unless a litter was involved, in which case the mother was housed with the kittens. In all 8 assessed pens the cats had access to the outside area through smaller doors. Some pens had two doors, as shown on the figure below (**Fig. 8**), while others had only one door.

Figure 8: Built-in shelves in shelter Ljubljana.

Figure 9: Inside and outside area of each pen in Ljubljana shelter.

The outdoor sections of each pen could also be connected to each other to increase space if needed (**Fig. 9**). In addition, the shelter had a special room where cats were matched with potential adopters. No sharp edges were present. In shelter 3 in each group housing 3 cats were housed. According to the shelter manager, a maximum of cats that can be housed in these groups is 12, but usually there are between 4 to 5 cats. As can be seen in the figure below (**Figure 10**), the cats had no access to the outside environment.

Figure 10: Courtyard part of the Koper shelter, where only feral cats roam freely.

Figure 11: Large mesh window in shelter Koper.

In shelters 4 and 5 it was more difficult to determine the dimensions of the enclosures because the the cats were housed in group housing, i.e. rooms of different sizes. The number of cats was adjusted according to the dimensions of each room. In shelter 4 the cats had no access to the outside environment, with the exception of the feral cats, that roamed around the shelter yard. However, each room had a large mesh window (**Fig. 11**) that let in a lot of light and allowed them to have contact with the outside environment. In contrast, cats in shelter 5 had access to an outside enclosed area. The shelter had two large terraces (**Fig. 12** and **Fig. 13**) that were connected to the group rooms by various passageways and pathways. The smaller outdoor area had the same dimensions while the larger terrace was 6 m long, 3 m wide, and 10 m high. In shelter 5 it was difficult to estimate the exact number of cats housed in each room because they were constantly entering and exiting, whereas in shelter 4, many of the cats were hidden and not visible during the assessment (n=10). There were no sharp edges in the rooms studied.

Figure 12: The main outside area in Škofja Loka.

Figure 13: The environmental optimisation in the outdoor area of shelter Škofja Loka.

Table 5: Information on the dimensions of different indoor and outdoor areas in shelters.

Animal shelter	Total size (m²)	Outdoor area size (m²)	Dog pen dimensions (m)	Dog pens (N)	Cat pen dimensions (m)	Sharp edges present (N of pens)
1	26.3	40	3 x 2*	5	1 x 1 x 1	8
2	1.45	2.06	/	/	/	/
3	/	/	/	/	2.5 x 2.5 x 2.5	/
4	/	/	/	/	/	/
5	/	/	/	/	/	/

Notes. N - number of pens, * - Information on the width was not provided.

Table 6: Presence and numbers of different resources in shelters.

Animal shelter	Type of housing	Resting place	Hiding place	Litter box	Substrate	Toys	Scratching material	Elevated surface	Bowls*	Material of food bowl	Material of water bowl	Type of food bowl	Type of water bowl
1	Individual	/	/	13	Clay	10	6	3	Yes	Plastic	Plastic	Bowls	Bowls
2	Individual	/	15	13	Clay	/	/	/	Yes	Stainless steel	Plastic	Bowls	Bowls
3	Group	12	5	4	Clay	2	1	2	Yes	Ceramics	Stainless steel	Bowls	Bowls
4	Group	/	/	13	Clay	/	/	/	Yes	Stainless steel	Stainless steel	Bowls	Bowls / Water fountain
5	Group	/	/	10	Clay	/	/	/	Yes	Ceramics	Stainless steel / Ceramics	Bowls / Interactive feeders	Bowls

Notes. *Food and water bowls.

As the table above (**Tab. 6**) shows, in shelter 1, optimization of environmental conditions and availability of resources were assessed in 13 individual pens and in one group housing, whereas in shelter 2, 8 pens were assessed. In both shelters cats were provided with soft, warm, and comfortable resting places and the number of toys varied, but toys were available in all shelters. In 6 of the 13 pens in shelter 1 the cats had scratching areas and in the group housing, cats had a total of 5 scratching areas, whereas in shelter 2 the number of hiding and resting places varied from pen to pen because we included the shelves that are part of the cat tree as resting places (**Fig. 14**).

Figure 14: Available resources such as resting place, a cat tree, food and water bowl and litter box in individual pen.

In shelter 2 each individual pen had at least of one cat tree and 2 built-in shelves that served as elevated surfaces. The scratching areas also included the areas associated with the cat trees, i.e. the cat poles. In contrast, in shelter 1 three of the individual pens, which were larger dog pens, had raised areas for the cats, while there were no raised areas in other smaller individual pens. In group housing, there were a total of 10 raised areas (shelves etc.). Food and water bowls

were available in each pen in both shelters. There was a litter box with a clay substrate in all individual pens. In shelter 3 optimisation of space was rather modest, as each group housing contained only one cat tree and one toy. The shelves of the cat trees (7 on one cat tree and 5 on another) were assessed as resting places, as no additional beds were available for the cats. The holes in the cat tree were assessed as hiding places, one hiding place in one cat tree and 4 hiding places in another cat tree. Only one group housing had one wall scratcher. Food and water bowls were available in each pen. In all individual pens the cats had two open litter boxes with asubstrate of clay. For 3 housed cats only one toy was provided. In shelter 4 it was generally very difficult to estimate the exact number of resting places, hiding places, elevated surfaces, and scratching materials because they were abundant. In each room the cats had food and water bowls. The number of toys was not accurately counted, as this was easier to estimate in individual pens. However, shelter 5 had the fewest toys. A total of 10 toilets (in shelter 5) were counted in 8 rooms surveyed, andthe substrate was clay. In 3 of the 8 rooms, the cats had two closed toilets (**Fig. 15**), while in the other 5 smaller rooms they had only one closed toilet.

Figure 15: Two closed litter boxes in the corner.

In shelter 5 environmental optimisation and the availability of resources was assessed in 3 indoor main group housed environments i.e., rooms and two larger outdoor areas. Only feral cats were housed in one of the 3 rooms. It was very difficult to estimate the exact number of resting places, hiding places, elevated surfaces and scratching materials because of their abundance (**Fig. 16**).


Figure 16: Complex and interesting environmental optimisation in one of the shelters visited.

In addition, there were resources such as boxes, an old television, a cellotte wardrobe of raised surfaces closed with doors that served as a hiding place, to scratches with holes (**Fig. 17**). Additionally, it was difficult to assess the resources in the outdoor areas (**Fig. 18**) because not all were clearly visible from a distance. In each room the cats had food and water bowls, many of which were interactive feeders.

Figure 17: Examples of hiding and resting places inside of the closet in one of the visited shelters.
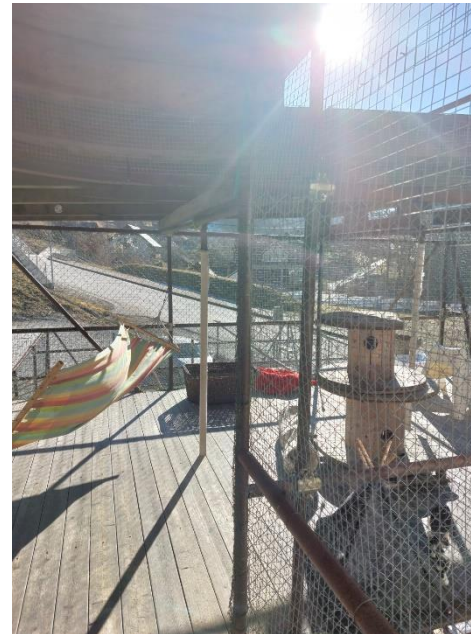
Figure 18: Environmental optimisation of the outdoor area such as the wooden structure and hanging mesh.

The cats had interactive toys with balls all over the floor (**Fig. 19**). There were variety of scratching surfaces in all 3 rooms, many of which wereof natural wood. We did not accurately count the number of toys becausethis was easier to estimate in the individual pens. We counted a total of 13 toilets, with the substrate consisting of clay. 3 of 13 the toilets were in the room with the feral cats. The remaining 10 toilets were distributed in two smaller rooms (each room contained 5 toilets), which were connected to the two larger rooms by holes and passages (**Fig. 20**). The cats could also defecate outside, as they had access to the outside environment at all times.

Figure 20: Separate room with 5 litter boxes in one of the visited shelters.
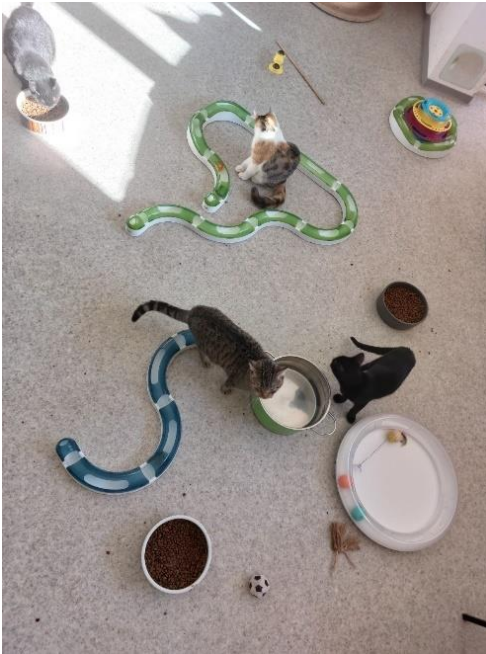
Figure 19: Stainless steel food bowls and interactive toys placed on the floor.

Food and water bowls were available in all shelters, but the number and the materials varied depending on the type of housing (individual or group). Cats were provided with fresh food and water in all shelters. The spacing between water and food bowls was adequate only in shelters 4 and 5, where bowls were distributeddifferently in the rooms (**Fig. 21**) or food and water bowls were separated by a shelf (**Fig. 22**). Plastic food and water bowls were available only in shelter 1 and a water fountain available in shelter 4. The cats in shelter 5 also had two interactive feeders.

Figure 21: Food and water bowls are placed in a way where there is an adequate distance between them.

Figure 22: Distance between food and water bowls by shelve in shelter 4.

The microclimate was assessed with the completion of the questionnaire and by observation of the shelter environment **(Appendix 1, page 159).** In all shelters, cats had access to daylight via sunlight. In shelter 4 and 5 where the cats were mostly housed in group housing, the rooms were very bright and airy and had large barred windows (**Fig. 23**) that were open at the time of the assessment, so the cats had constant contact with sunlight and the outside world/nature.

Figure 23: A large window allows a lot of warmth and sunlight to enter the environment in shelter 5.

In shelter 1 and 2 where the cats were mostly housed individually, i.e., in individual pens, they had access to sunlight and the outside area. In shelter 3 two pens of group housing had a small window that let in some light, but the cats did not have access to the outside area because of the windows that did not open. i.e., fixed windows According to the information provided by the managers, the cats were not exposed to external environmental factors (drafts), as care was taken in all shelters to close windows or doors tightly in case of drafttts. Additionally, no signs of hyperthermia or hypothermia were detected. However, not all shelters (shelter 4 and 5) provided the adequate information about the temperature of the environments. In shelter 4 the rooms were heated by central heating through radiators and the assessor could not measure the exact temperature. The corridors were heated by air conditioners. In contrast, the temperature in the open department (adoption area) in shelter 1 was between 15–17° C on the day of the assessment, where in shelter 2 the temperature of the open department was 22,4° C and 22,1° C in the quarantine area. The assessor did not receive any information about the adoption area in shelter 3, whilst the temperature of the quarantine area was provided (20–22° C).

3.2.3 At individual level

The cats were visually observed by the investigator, who was standing outside the enclosure and scored using scoring sheets **(Appendix 1, page 146–211)** from the protocol at a distance of approximately 1–2 m (in front of the individual pens). During the assessment at individual level the assessor took short breaks that additionally allowed the cats to remain calm and reduce any stress level that may have been present.

As can be seen in table below (**Tab. 7**) the Cat Approach Test was performed in individual housing only in shelter 1 and 2, and in shelter 1 it was additionally performed in group housing. However, the moment the assessor entered the group housing to carry out the assessment, the cats hid in hiding places or retreated to shelves or cat trees, so the assessor continued the assessment in the individual pens. In other shelters the test was performed in group housed environments. In addition to measuring the contact between the assessor and each individual cat, the assessor recorded how the cats behaved during the test. The highest number of cats that approached the assessor was in shelter 5. In shelter 2 three cats approached the assessor, while

5 of them did not. Three of the five cats that did not approach the assessor were sleeping. Shelter 2 was the only shelter where the individual pens had doors that did not allow physical contact. In shelter 3 five of six cats assessed approached the assessor, all of them sniffing the assessor with interest and rubbing against her. In shelter 5 a total of 17 out of 24 cats assessed approached the assessor, however, due to the larger number of cats, it was more difficult to accurately judgewhich cat wanted to make contact and which did not. All of them showed behaviours like sniffing, rubbing, exploring the assessor, jumping, sitting on the assessor's shoudler, kneeling, meowing, purring ...). All were very relaxed and showed a desire to interact. No contact was possible with 14 of the 23 cats assessed in shelter 4. The behaviours that the assessor observed were immediate retreat, hissing, tension of the whole body, the cats were positioned close to the ground, some even frozen. They withdrew their gaze and their pupils were dilated. In addition, **Tab. 7** presents the results of two assessment methods, the Cat Stress Score and the Frustration scale, which both measure the presence of stress in cats. The number of cats assessed did not match the number of other measurements, because the assessor performed the assessment at different time periods (i.e., not all at once). Fewer cats were included in the assessment, either because the cats were sleeping or hiding. In addition, Cat Stress Scores were not assessed in shelters 1 and 3 because the scoring sheet was not yet designed in a practical format in which the assessor could record data for multiple cats rather than just one. The highest average Cat Stress Scores were measured in shelters 4 and 5, where cats were housed in group housing. In addition, frustration scores ranging between 0 and 6 were highest in shelter 3 and 5.

Additionaly, **Tab. 7** shows the results of body and coat condition, assessed along with the Cat Approach Test, as recommended by the authors of the protocol whenpossible. As the table shows the number of cats scored for Body Condition Score did not match the number of cats scored for coat condition score and the Cat Approach Test. This was due to the large number of the cats in shelter with group hosuing and the fact that they were constantly moving in and out, which made it more difficult to score all cats. As the results show, very few of cats assessed in each shelter had poor coat condition.

Table 7: Results and means of the different assessment methods at the level of the individual cat

		Cat Approach test				CSS and Frustration Scale			BCS		Coat condition			
Animal shelter	N	Type of housing	Contact possible*	Contact not possible	Type of pen material	N	CSS (M)	Frustration Scale (M)	N	M	N	Dirty	Shaggy/Matted	Bald spots
1	13	Individual/Group	7	6	Wire	/	/	0	5	5	/	/	/	/
2	8	Individual	3	5	Glass	8	1,77	0,4	8	4,7	8	0	2	0
3	6	Group	5	1	Wire	/	/	0,67	6	5	6	1	2	1
4	23	Group	9	14	Door /glass	11	3,9	2,6	5	5,6	19	2	2	0
5	24	Group	17	7	Door	2	3,6	1,56	9	5	14	3	0	0

Notes. N – number of assessed cats, M – mean.

Table 8: Results of hyperthermia and hypothermia and the presence of diarrhea

		Hyperthermia and hypothermia					Diarrhea			
Animal shelter	N	Type of housing	Presence	Signs	T	Season	N	Presence	Visibility	Category
1	13	Individual	No	/	17	Spring	13	3	Yes	Soft
2	8	Individual	No	/	22,4	Spring	0	/	No	/
3	6	Group	No	/	/	Spring	0	0	No	/
4	23	Group	No	/	/	Spring	0	0	No	/
5	24	Group	No	/	/	Spring	0	0	No	/

Notes. N – number of assessed cats, T – temperature.

As seen in the table above (**Tab. 8**), the presence of hypothermic and hyperthermic behaviours was determined from behavioural observations of cats in individual pens. In all shelters cats were provided with adequate thermoregulatory aids (soft and warm blankets, cardbboard boxes). Additionally, the ambient temperature and season were appropriately checked during this measurement. In none of the shelters visited did the cats show signs of hyperthermia or hypothermia. Although we did not obtain sufficient information about the ambient temperature in shelters 4 and 5, the rooms were bright and warm. In addition, **Tab. 8** shows the results related to the measurement diarrhea. The presence of diarrhea was recorded only in cats housed individualy, as recommended in the protocol authors' instructions. This measurement was only assessed in shelters 1 and 2, as they both housed cats in individual pens. However, we could not perform this measurement in shelter 2 because all toilets were closed, so the presence of diarrhea was not visible. Overall, of the 13 cats assessed in shelter 1, three had diarrhea that was of a soft consistency. Using this information, the assessor checked the records of the cats with diarrhea and their treatment protocol. All three were given the appropriate medication (Digest pro capsules) and an appropriate food ("Sensitive" dry and wet food for sensitive digestion). According to the caretakers at shelter 4, diarrhea only occurs when cats are admitted to the shelter (in the first 14 days), no cats with diarrhea were housed at that time.

As shown in **Tab. 9** eye discharge was present primarely in shelter 5, as 5 of the 24 assessed cats had all eye discharge. According to the shelter manager, more than 5 cats in the shelter had discharge, but it was difficult to estimate because they were constantly moving from indoors to outdoors. The presence of respiratory disorders was visually assessed using the scoring sheet **(Appendix 1, page 202).** In general, 3 of the 84 assessed cats sneezed and only one cat coughed. In shelter 2 none of the cats assessed showed signs of coughing or sneezing. The assessor could not accurately assess the presence of sneezing or coughing in shelter 5. Many cats sneezed, but it was difficult to determine the number of sneezing or coughing cats because, as mentioned earlier, they were, constantly moving from indoor to outdoor areas.

Table 9: Information about the presence of respiratory disorders and different types of discharge in shelters

Animal shelter	Discharge					Respiratory disorders		
	N	Eye	Nose	Ear	Type	N	Sneezing	Coughing
1	0	0	0	0	/	13	1	1
2	8	1	0	0	Bloody	8	0	0
3	6	0	1	0	Serous	6	1	0
4	23	3	1	0	Mucous	23	1	0
5	24	5	0	0	Serous	24	/	/
Mean	/	1,8	0,5	0	/	/	/	/

4.   DISCUSSION

To the authors' knowledge there is currently no standardised protocol for assessing the welfare of cats in animal shelters. In this pioneering study a comprehensive protocol for assessing the welfare of shelter cats was developed for the first time and subsequently applied in 5 Slovenian shelters. The protocol encompasses five domains (nutrition, environment, health, behaviour and mental state) of the Five-Domains Model (Mellor et. al., 2020) and can be applied at three main levels, namely the shelter, the pen and the individual (i.e. single cat) (**Tab. 1**). The first part of the study, where we developed the first version of the protocol and visited shelters helped to improve the overall protocol and identify which methods are useful and which are not, or could be refined. In the next stage of our study, i.e., assessment, the first version of the protocol was tested in 5 Slovenian shelters in order to develop the final version of the protocol. In this process some new methods were added, some were excluded and some were adjusted to be the most practical and useful for the assessment. In general, our results show that we can not draw specific conclusions regarding the assessment at individual level, as the sample size was too small, because we have encountered difficulties in finding shelters that would house more cats at the time of the survey. In addition, shelters did not want to take part in the survey either due to unknown reasons (they did not provide any specific arguments why) or due to the COVID-19 restrictions to limit the spread of the disease. This caused us to be somewhat limited and prevented us from performing a solid statistical analysis of the data collected. Instead, the data were mostly presented in a descriptive manner. However, this does not imply that the protocol is not applicable and useful, as we believe that the protocol can be used to find out different parameters in cats, but it is recommended that the protocol should be tested in the future, on a larger number of cats.

4.1 Development and use of the protocol for shelter cats

In developing the protocol, we carefully considered – with the help of other scientific literature – how to integrate such assessment methods and tools that are already recognised and reliable,

non-invasive, practical and require a relatively short training period (Vojtkovska et al., 2020). Moreover, one of our long-term goals was to develop such protocol with training in mind. Therefore, the theoretical part was designed to familiarise the user with the biological needs of cats, the basics of cat behaviour, communication, and appropriate cat-friendly handling and care. We believe that this makes the protocol for shelter cats more innovative than other existing AWIN protocols (2015) and protocols of the Welfare Quality® Project (2009), because they do not include prior information about the behaviour of the species for which the protocol is intended. The use of such a protocol will not only result in more reliable data, as users will be better trained and able to perform the assessments, but will also educate the general population on the basics of cat behaviour. In addition, we believe that, one of the advantages of the protocol is that especially shelter staff can perform rather simple analyses of the data (means, frequencies), as this was a qualitative study, where more complex analyses of the data were meaningful. Therefore, our study can also be used in the further assessments as an example of how to obtain certain results.

In designing and selecting questions for the shelter-level assessment questonnaire we were guided by several animal welfare protocols, but primarily the Shelter Quality Protocol for assessing wefare of shelter dogs (Barnard et al., 2016), as this protocol is intended for use in shelters. However, some questions were drafted based on the Shelter Conditions for Abandoned Animals (2000), as we believe it is important to include questions about cats in addition to the legal requirements, as this allows us to obtain information about whether or not shelters are operating in compliance with legal requirements. Compared to the protocol for shelter dogs, the following questions were added: the temperature in the quarantine area, presence of an animal checklist, total number of caretakers in the shelter, qualifications of caretakers, number of cats per caretaker, shelter response time, presence of a sound barrier and presence of pain medication. Additionaly, we included questions about the type of housing cats receive (individual, group, quarantine, isolation), the presence and number of outdoor areas, the maximum group size, and also whether shelters house cats separately from dogs. In terms of measuring»feeding cats« at the shelter level we included questions about who feeds the cats and how the food is stored, because shelter managers believe cats should be fed the same whether they are fed by caretakers, veterinarians or volunteers. It is of great importance that the quality and quantity of feeding is tailored to the cats. Therefore, the shelter must ensuresure that

volunteers, in particular, who are not at the shelter on a daily basis, are always aware of how the cats are being fed. Additionally, shelters should provide the animals with the best quality food possible, which is why the questionnaire was supplemented with the question of how dry and wet food is stored, because the way food is stored plays a crucial role in maintaining the nutritional and sensory properties of the purchased products over time, which in turn can affect the quality of the cats' health (Morelli et al., 2021). The results of the study by Holda and Głogowski (2016) showed that improper storage of dry food can lead to lipid oxidation and rancidification which in turn results in significant sensory changes in the dry food. As noted by Morelli et al. (2021) it is important that food be stored properly to maintain itssensory profile, nutritional value and microbiological safety until it is administeredto the animal. Based on the study by Thomas and Van der Poel (1996), shelter managers also recommend storing dry food in tightly sealed containers and wet food in refrigerators during the summer months because various environmental factors such as high temperatures affect the chemical and physical properties of pet food.

Based on the review by Vojtkovska et al. (2020), we considered both measurements that relate to the living conditions of the animals (resource-based mesaurements) and those that directly assess the individual animal (animal-based measurements). More than half of our animal-based measurements (n=14) used for the assessment at the individual level are behavioural measurements becasue according to the review (Vojtkovska et al., 2020), they are reliable and non-invasive. As noted by Vojtkovska et al. (2020), we agree that measures such as physiological and health measurements are of great importance because they, along with the behavioural measurements provide more accurate results and can demonstrate the presence of stress even when there areno external behavioural changes. However, these types of measurements such as blood sampling (to measure cortisol) or direct assessment of vital signs (respiratory rate, heart rate) were not included in the protocol because they may actually be invasive to the cats, as the cats need to be handled during the assessment and this could increase their stress level and interfere with the interpretation of the results (Vojtkovska et al., 2020).

In this protocol we used a modified version of the Cat Approach Test proposed by Arhant and Troxler (2017), which is based on a two-step assessment, because we believe that this assessment method is very suitable for measuring whether cats are socialised or not (based on

whether the cat wants to make contact or not) and because it does not require muchtime for acquisition. The method itself is also not difficult to implement, as the instructions in the original study (Arhant & Troxler, 2017) stated that the assessor should enter the room or stand in front of the cage, offer his hand, and wait for the cat's response and observe its reaction. However, we found that the type of door on each pen or the material of the pen door (wire, glass), if any, had a large effect on the interaction itself. In shelters with glass doors, these can affect the interaction between the assessor and the cat, and consequently the results, as the cat may want to make direct contact with the assessor but cannot because of the glass doors. Therefore, we included this as a new assessment parameter. The observational method used to measure the presence of stress in cats (Cat Stress Score) was based on the original study by Kessler and Turner (1997), but with some modifications. In the original study, the assessment was administered four times throughout the day, with pauses in between, which meant that the user had to take a long time to complete the assessment. In the original study by Kessler and Turner (1997) cats are evaluated 4 times a day, whereas in our study they are only evaluated once, after feeding. The observations of each cat were one minute long, therefore we shortened the assessment. In addition, the evaluation form for the Cat Stress Score assessment was adapted and modified. It was based on the evaluation form used by McCune (1994), but we designed the evaluation form so that the assessor could include multiple cats in one assessment and not just one, as in the original study.

In our opinion, in addition to the Cat Approach Test and the Cat Stress Score, other observation methods are applicable at the individual level (Frustration scale, hypothermic and hyperthermic behaviours, presence of diarrhea, body and coat condition, eye, nasal and ear discharge, respiratory disorders) were applicable and because of their practicality, can be used by other users such as cat caregivers or even people who are not experts in felinology. The inclusion of these individuals was one of the goals in developing the protocol, as we feel that we are broadening the application of the protocol in the interest of a wider audience. In addition, the protocol is written in English, and because it includes detailed descriptions of the functions of the assessment methods as well as instructions for their use, we believe that the protocol can be used on a global scale. In addition, observational measurements intended for pen-level assessment (environmental optimisation and the availability of resources, microclimate, water and food supply) can be used in environments other than shelters. These assessment methods

are suitable for use in cat salons, cat hotels and for assessing the cat caretakers' homes, since the assessment is primarily concerned with the environment in which the cats are housed. The results obtained by other users can then be compared with the recommendations we have included in the theoretical part of the protocol, which are based on peer-reviewed literature. (Ellis et al., 2013) In this way, other environments can be adapted to meetthe needs of cats and improve their welfare. In contrast, some of the health measures such as the Karnofsky Scale (Hartmann & Kuffer, 1998), the Feline spectrum assessment (American Society for the Prevention of Cruelty to Animals, 2017), Quality of Life Assessment (International Cat Care, 2020), Body Condition Score (Teng et al., 2018) and Muscle Condition Score (World Small Animal Veterinary Association, 2020), are included in the protocol and are intended for use by a narrower range of users, such as veterinarians and shelter caretakers. Compared to the Body Condition Score (Teng et al., 2018), which is a fairly well-developed assessment method, we feel that the Muscle Condition Score (World Small Animal Veterinary Association, 2020) could be improved in the future by adding better examples and assessment instructions, as we believe that the muscle examination may be more challenging for someone who is not a veterinarian, as they may not have the knowledge of the muscle groups, which may lead to an incorrect score.

In line with the recommendations of Vojtkovska et al. (2020), some methods could be adapted in the future regarding their feasibility in shelters, such as the Karnofsky score. It generally consists of two parts: the first part being the veterinarian's evaluation of the cat (clinician's score) after assessing its health status and physical condition and the second part consisting of a questionnaire with questions about behaviour answered by the owner (World Small Animal Veterinary Association, 2020). Although this assessment method is not primarily designed for cats in shelters, because the second part can only be assessed by cat owners, its relative nonspecificity makes it one of the few tools that can be used in this context (Vojtkovska et al., 2020). Therefore, it would be interesting, if it could be adapted in the future assessments to be completed by caretakers who are in daily contact with cats.

4.2   At shelter level

The results of the questionnaire, which included questions on general information about the shelter, management, feeding of cats, social housing, mortality and morbidity, as well as euthanasia, were obtained by completing the questionnaire with the shelter manager or shelter caretakers. As can be seen from in the above results (**Tab. 4**) all caretakers in the animal shelters were adequately educated and trained. According to the regulations on the conditions that must be met for animal shelters for abandoned animals (2000), animal caretakers must be trained to work with animals and be able to provide first aid to animals when neccessary; therefore, the training is as a requirement for working in ananimal shelter. However, one of the shelter managers stated that the training conditions in Slovenia could be improved, as the training itself deals more with dogs than with cats, and further training of animal caretakers should be carried out. In two of the 5 shelters assessed, the managers were veterinarians, as Article 9 of the Animal Shelter Regulation (2000) states that a shelter manager must have at least a secondary degree in veterinary medicine or a secondary degree in another discipline and experience in working with animals. Almost no shelter had a working system in which the caretaker is responsible for a certain number of cats. However, the shelter must employ at least one animal caretaker for every 20 dog spaces. In addition, it is not specifiedhow many caretakers should be employed for a given number of cats. According to one of the shelter managers, caring for a cat is not the same as caring for a dog (since neither has any special characteristics). The dog needs to be walked and more work is put into training and caring for it. This may also be due to the fact that the number of cats is usually too high and the number of staff is too low, especially during the litter season. In contrast to the protocol for shelter dogs (Barnard et al., 2016), which does not specify the number of caretakers per cat/dog, we believe this should be a necessity, as having sufficient staff is not only important from the point of view of caring for and looking after the animals, but is also a factor that influences staff satisfaction and motivation. The results of one study (Mellor, 2016) show that when working conditions for animal caregivers are poor (i.e. not enough staff), higher physical and psychological work demands can lead to a higher incidence of stress for caregivers. In another study (Hoy-Gerlach et al., 2021) that examined the factors that have the greatest impact on staff stress, the results showed that stressors such as inability to provide the desired leve of animal care due to limited

funding and resources, overwork, poor team environment, challenges working with the public, personal safety, and vulnerability were among the most important factors. Therefore, it is important that animal shelters have sufficient and realistic numbers of staff to be able to care for the greatest number of animals in the shortest amount of time possible, yet within a framework that does not place undue stress on their physical and mental health.

The results show that the number of individual kennels in the shelters varies. This is not only because of the way shelters house cats (individually or in groups), which shelter managers say is their decision, but also because of the shelters' financial and space capacities. Our results show that 3 of the 5 shelters house cats in groups. However, these shelters also reported the presence of individual pens used only to house cats at intake (n=5), in quarantine (n=10), or to house cats that cannot live in groups. Not all shelters had soundproofing to minimise loud noises, which can greatly affect cats' stress levels. Cats, in particular, are greatly affected by the barking of dogs (McCobb et al., 2005). Therefore, we believe that all shelters should install a sound barrier to minimise noise, because an appropriate acoustic environment is essential for animal health and welfare (Newbury et al., 2010).

4.3   At pen level

The results of the evaluation of the enclosures in terms of space showed that 2 out of 5 shelters housed the cats only in individual pens. The size of the individual pens varied between these two shelters. We compared the results on the dimensions of the individual pens with the shelter's regulations (2000), which state in Article 5 that the living pen for cats must be at least 1 m x 1 m x 1 m in size. Both shelters met these criteria, but according to the managers, they want to increase the size of the enclosures in the future, as the current situation meets the minimum standards. Therefore, they are trying to place the cats in larger kennels, i.e. dog kennels, as this will give them more space and height and will provide the cats with more resources. In contrast, the dimensions of the individual enclosures in Animal Shelter 2 were larger than specified in the regulations (2000), and they had the ability to connect the outdoor areas of the individual enclosures to create more space if needed (**Fig. 9**). This is because Shelter 2 (**Fig. 6**) was

completely renovated in the last two years and the cats are now housed in a separate building with larger dimensions. This could give the impression that the shelter is trying to create better individual living conditions for the cats. According to our results, the total indoor size of group housing in shelter 1 was 26.3 m^2 and the total outdoor size of group housing was 40 m^2. According to the shelter regulations (2000) only 15 adult cats can be housed in group housing if the room dimensions are 3.0 m x 4.5 m x 2.0 m. The dimensions were appropriate under shelter regulations (2000), but we did not obtain the number of cats currently housed in the group quarters. Shelters 4 and 5 did not provide information on the dimensions of the group housing or the exact number of cats housed in the groups and they did not provide the reasons for not sharing this information. In addition, the assessment was difficult for us because cats were constantly entering and exiting the room. Nevertheless, this does not mean that the protocol is not suitable for the assessment in this respect. One idea to upgrade this assessment could be to mark the cats with colors and identify them. However, shelter 4 provided the information about the dimensions of the outdoor areas (6 m x 3 m x 10 m) which allowed cats more exercise and contact with the external environment. In addition, cats had more opportunities to withdraw from other cats, when needed. As it was shown in study by Loberg and Lundmark (2016) larger areas can increase the welfare of cats in groups, as cats have the possibility to choose when and whom to have social contact with. In a smaller area with the same group size, i.e. at a higher stocking density, they are forced to have shorter distance to other individuals. The results showed that the maximum number of cats in group housing in shelter 3 was too high (n=12) according to the shelter regulations (2000), which recommends a maximum number of cats (n=15) in a case where the dimensions of the room correspond to 3.0 m x 4.5 m x 2.0 m, given that the dimensions of their pens were 2.5 m x 2.5 m x 2.5 m. In relation to our assessment and the shelter regulations (2000) it would be interesting in the future to assess which type of accommodation is more suitable for the cats regarding their welfare, as this was not one of the aims of the protocol, but according to the study (Turner et al., 2012) overcrowding at animal shelters impacts on stress levels of cats and reduces their welfare. It induces adverse stress when unfamiliar animals of the same species are mixed, increasing susceptibility to infection, as well as concentrating infectious particles and fomites, and increasing opportunities for transmission to naive or debilitated animals (Griffin, 2017). However, in further assessments it is advisable to obtain information on the exact number of

cats that are housed in groups in order to see if the shelters are operating in accordance with the shelter regulations and in terms of ensuring positive welfare.

The presence of sharp edges was observed only in individual pens of one shelter, which shows that this aspect is a a problem in 1 of 5 (20 %) Slovenian shelters. However, the presence of sharp edges could affect the maintenance of proper sanitation in individual pens of this shelter and consequently welfare of their animals. The study by Barnard et al. (2016) showed that pens with sharp edges may be risk factors for animal cleanliness, skin condition and body condition, as dogs housed in pens with sharp edges were more likely to have higher prevalence of poor skin condition. We agree with their study that it is important to consider this parameter in any legislative framework that aims to improve the welfare of animals housed in shelters, therefore in any future welfare assessment of cats using our protocol, skin and coat condition should be linked to this parameter (Barnard et al., 2016).

In relation to environmental optimisation, we can say that in line with the study (Ellis et al., 2013) which proposes recommendations on environmental optimisation, key environmental resources include feeding, drinking, toileting, claw scratching, play and resting/sleeping areas. Our assessment included the number of resources as well as the presence of these key resources, because we believe that from a welfare point of view it is necessary to have a sufficient number of resources in relation to the number of cats placed in shelter. In general in all shelters cats were provided with basic resources such as food, water, resting places, hiding places, scratching materials, litter boxes and toys, although the results in **Tab. 6** do not show the exact number of environmental resources. According to the assessment, the cats in shelter 3 had the least environmental resources available to them, as the group housing of 3 cats had only one cat tree, one scratching post and one toy. No additional beds or hiding places such as for example cardboard boxes were available for the cats. According to the welfare reccommendations (Ellis et al., 2013), it is stated that one cat should have at minimum of two resources, as they should have a choice for each resource which in addition reduces the incidence of conflicts. Therefore in shelter 3 cats could have at least 6 toys and at least one additional cat tree, as 6 of them would be too much, due to lack of space. In shelter 1 we recorded more environmental resources available in larger dog pens than in the individual pens, as they were too small. In general, the first reason we did not specify the exact number of key resources, was because we did not know

whether to count the shelves that are part of the cat tree as resting places or elevated surfaces. The second reason was mainly due to the type of housing. In shelters 4 and 5 where cats were housed in groups, it was difficult to count the exact number of available resources (**Fig. 16**), as there were so many of them. Therefore, for the future assessment, it would be advisable to specify what exactly should be considered as a scratching surface.

The number of litter boxes varied between shelters. In shelter 5 cats were provided with open litter boxes in the indoor areas and in addition, they had an option to defecate outside. Shelter 2 and 5 were the only shelters using closed types of litter boxes. In our opinion, regarding the welfare aspect, the provision of closed-type litter boxes might not be the best option, as studies have shown, in most cases covered litter boxes are discouraged by cats, as they trap odors and are small and owners may be less likely to scoop routinely ("out of sight is out of mind") (Ellis et al., 2013). All shelters used clay as the main substrate for elimination of cats. However, some studies have shown (Borchelt, 1991) that most cats prefer unscented and finely particulate clumping type litter. In another study, most of the cats did not preffer litters with large particulate matter (Neilson, 2004). Additionally, we observed whether the resources were distributed all over the place in shelters and whether there was a distance between water and food bowls. Based on Ellis et al. (2013) resources should be available in multiple locations in environments where cats are placed in group housing, as this allows them to have free access to key environmental resources without being challenged by other cats. Providing individual eating and drinking locations allows for the privacy needed to prevent the stress associated with feeding competition (Ellis et al., 2013). Our results show that resources were not evenly distributed in all shelters. Even distribution was only present in shelters 3, 4 and 5, where cats were housed in group housing with more space. While in shelters 1 and 2, resources were not located in separate locations, due to the small size of the individual pens.

In all shelters cats were provided with fresh food and water source. Food bowls and plastic bowls in shelter 1 were made from plastic, where in shelter 2 only water bowls were plastic. In the other shelters, water and food bowls were either ceramic or stainless steel. We believe that providing ceramic or stainlees steel food and water bowls is a better choice both from a hygiene and a welfare point of view, as plastic is a rather porous and quickly destructible material

through which various bacteria can quickly penetrate. Scratched and porous surfaces, such as plastic are difficult or impossible to completely disinfect and should be used with caution or discarded (Newbury et al., 2010). All shelters provided cats with basic food and water bowls. In addition, cats in shelter 4 were provided with drinking cat fountain and in shelter 5 did they had additional interactive feeders. We belive that shelters should integrate such resources to cats, as according to cat behaviour, such feeding devices and practices require the cat to actively acquire food. Cats should be able to engage in pseudopredatory play and feeding behaviors (Borchelt, 1991).

Our results regarding the measurement of microclimate show that the open sections of shelters 1 and 2 were in accordance with the Article 3 of the Animal Shelter Regulations (2000), which state that the recommended temperature should be between 5° C and 26° C and should not fall below 0° C. However, the manager of shelter 1 mentioned that during the summer months, temperatures in the open department can exceed 30° C, therefore one of their future aims is to install air-conditioning. The temperature in the quarantine area in shelter 2 was 22.1° C and between 20 and 22° C in shelter 3, thus in accordance with the regulations which state the temperature in the quarantine area should not be below 20° C. In addition, adequate ventilation must be provided in enclosed animal rooms in which the walls and roof must be adequately insulated. In shelters 4 and 5, where cats were placed in group housing (i.e. rooms) the conditions were very bright and airy, and the large terraces were well protected and adequately fenced in accordance with shelter standards (Newbury et al., 2010) to protect the cats from bad weather and vandalism and to prevent escape or predation. Interestingly, the cats in the shelter had 3 fixed windows that could not be opened, and because fresh air is essential for maintaining health and well-being and for limiting the spread of infectious diseases (Cat Fancier's Association., n.d.) changes in ventilation would be advisable in relation to the welfare of cats. In addition, proper ventilation removes heat, moisture, odors, airborne microbes, and harmful gasses such as ammonia and carbon monoxide, while allowing fresh, oxygen-rich air to enter (Newbury et al., 2010). One of the limitations which we have faced during the assessment of microclimate was data collection about the temperatures of shelter environment. In the assessment process we first checked whether there were thermometers in the room that could measure the temperature itself and we detected one only in shelter 1. In shelter 2 the information

about the temperature of the open department and quranatine area was provided by shelter manager, where in shelter 3 we were only given information on the quarantine temperature. In the remaining shelters (3, 4 and 5) for unknown reasons, the managers did not provide us with this information. even though we have asked them again about the same information after the assessment. We belive this should be tested again in further assessment and comparison between shelter should be made, as it is important that the ambient temperature in shelters is adapted to the species, as this allows the cats to successfully regulate their body temperature (Newbury et al., 2010).

4.4   At individual level

In relation to the measurement Cat Approach Test, the results show almost more than half of the cats assessed in each shelter approached the assessor, except in shelter 4, where only 9 out of 23 cats were approached. According to our assessment, there were also a lot of cats in that shelter that hid and could not be seen and included in the assessment. However, we cannot conclude from this that this is an indicator that the cats are not socialised, as well-socialised cats may also show fearful aggression or motivation to escape (Vojtkovska et al., 2020). In contrast the highest number of cats that approached the assessor was in shelter 5. Based on our results, we could say that the cats in shelter 5 were the most socialised, as they were all very relaxed and were looking for interactions, although it was difficult to estimate the exact number of cats assessed as they were constantly entering and leaving the environment. In order to make future assessments more reliable and accurate, cats of similar appearance could be marked and identified in accordance with the original study (Arhant & Troxler, 2017) to facilitate assessment in group placements. We could claim that the implementation of Cat Approach Test on cats which were housed individually was easier to assess, as there was a clear one-to-one interaction between the assessor and the cat and the assessor was able to assess the individual cat's responses more accurately and easily. As aforementioned (**page 34**) we have found that the material of the pen door (wire, glass), if present, has a huge influence on the interaction itself, as our results shows that cats which were housed in individual pens with glass doors were identified as the cats with which contact was not possible.

The presence of stress was measured using two assessment methods: the Cat Stress Score and the Frustration Scale. Our results show that the cats in shelter 2 were not stressed because the average score was less than 3. According to the suggestions of the authors of the Cat Stress Score, a score less than 3 is still acceptable because it represents only the basic level of stress present in any living animal (Kessler & Turner, 1999). In contrast, in shelters 4 and 5, the average score was above 3. However, this does not automatically mean that the cats were stressed because, according to the authors of the Catt Stress Score, an increase above this value represents a response to an acute stressor and is not a problem as long as the score does not remain the same over time (Kessler & Turner, 1999). Interestingly, the Cat Stress Score was not used in shelters 1 and 3 because the score sheet had not yet been designed in a practical format in which the assessor could record data for multiple cats rather than just one. After the evaluation, we modified the score sheet accordingly. Although the Cat Stress Score has been used in many different studies (Tanaka et al., 2012) it should be used in future evaluations on a larger number of cats to obtain reliable results by using the updated scoring sheet. Our results (**Tab. 3**) of measuring stress with the Frustration Scale show that cats with an average score below 1 (in shelters 1, 2 and 3) showed no signs of stress, whereas an average score of shelter 5, which was above 1, indicated that the cats showed mild signs of stress. Shelter 4 had an average score of 2.6, falling into the moderate signs category (2–3), indicating that cats showed 1 or 2 mild signs of stress. Overall, based on these results we cannot really draw any conclusions on Slovenian shelters regarding the stress levels of cats. However, as shelter managers have informed us, trying to create environments that are as stress-free as possible for the cats. However, the results in shelter 5 were slightly higher than in the other shelters. The results in shelters where cats were housed individually (1 and 2) were much lower in comparison to shelter 5. We can not say with certainty that the type of accommodation is the main reason, as there may be several reasons or stress factors for such scores. In our opinion, the reason might be due to the number of cats being too high for the room dimensions, which does not enable the cats enough space and opportunities to retreat when needed (Turner et al., 2012). Additionally, what affected the reliability of our results, we did not assess the frequency of occurrence of these signs within a minute, because there were too many cats in the room and it was more

difficult to focus on each individual cat as they moved or hid and were not visible to us. Thus, this could be done in future assessments to obtain accurate and reliable results.

Our results show that the number of cats scored for the Body Condition Score did not match the number of cats scored for the Coat Condition Score and the Cat Approach Test, as the authors of the protocol suggested that these three assessments be performed together. However, this was difficult to perform because cats were constantly moving in and out. As mentioned earlier, the cats could be marked to identify them and obtain more reliable results. Based on the weight categories (0–9) in the protocol, the average Body Condition Scores of the cats in Shelters 1, 3 and 5 fell into the "optimal" category, while the cats in Shelter 4 fell into the overweight category with an average score of 5.6. Because the sample size was very small, we can not say that this is an indicator that all cats there were overweight. According to the evaluator, we agree that the most obese cats were in shelter 4, while the most agile and athletic cats were evaluated in shelter 5. We believe this is because the cats in shelter 5 had the opportunity to exercise on the outdoor patios much more than the cats in shelter 4, where they could not go outside. Thus, we could argue that the Body Condition Score results could be an indication that the shelter was housing too many cats in the rooms or not providing them with enough stimulation and exercise. In addition, the cats in Shelter 4 had the fewest toys available, which could indicate that they did not have enough toys to play and exercise. Perhaps the stress of group housing is also responsible for the BCS results, as stress strongly affects food intake (Stella et al., 2013). In agreement with the study (Tanaka et al., 2012), we believe that one cannot conclude that cats are obese based on the Body Condition Score alone. It might be useful to measure body weight directly as suggested by Vojtkovska et al. (2020). However, according to one study (German & Morgan, 2008), similar to BCS, direct measurement does not indicate the ratio between the different body components (fat and muscle), so its use is not appropriate when monitoring of these components is required.

As the results show, very few of the cats examined in each shelter had poor coat condition, as only one cat had bald patches and a total of 6 cats had dirty or shaggy/matted coats. Due to the small sample size, we cannot draw exact conclusions, although we could argue that this is due to the type of housing, as conflicts between cats may be more frequent. However, we also need

to consider the health status of the cats and their diet. This will be tested in the future, as the condition of the coat can be an excellent indicator of health, reflecting not only the nutrition of the individual and the incidence of chronic diseases, but also the quality of social interactions (Arhant et al., 2015).

To our knowledge, no cats showed signs of hyperthermia or hypothermia in all shelters. Interestingly, the cats in shelter 3, where according to the evaluator it was cold and the cats did not have soft and warm beds, but only a scratching post, showed no signs of hyperthermia or hypothermia. In accordance with shelter standards (n.d.) we believe it is important that all shelters not only provide animals with the necessary means to maintain their body temperature to ensure animal comfort and safety (i.e. thermostat adjustment, additional bedding, fans, relocation to another area of the shelter, health screening etc.), but that regular behavioural observations of the cats are also conducted, especially during the winter and summer seasons, as there are individual differences in temperature regulation, such as breed, body condition, health status, hair coat, face shape and age difference (The Association of Shelter Veterinarians, n.d.).

The occurrence of diarrhea was recorded only in individually housed cats, as recommended in the protocol authors' instructions. The results show that only a small number of cats (n=3) in shelter 1 had diarrhea. In Shelter 2 it was difficult to assess the presence of diarrhea because of the enclosed toilet available to the cats. It would have been useful to check the medical history of the cats, as was done in shelter 1, because this is required by the protocol, but we did not have access to these data. According to the caretakers at shelter 4, diarrhea occurred only when the cats were admitted to the shelter (in the first 14 days), based on Vojtkovska et al. (2020) gastrointestinal problems, vomiting, and diarrhea are often associated with stress. In addition, group housing may also strongly influence the occurrence of diarrhea, diarrhea was is common in kittens and cats housed in group housing (Vojtkovska et al., 2020). However, the shelter manager at Shelter 4 argued that cats do not find group housing distressing if they are housed appropriately for their age and have access to a variety of resources. In addition, we wanted to include an assessment of diarrhea in group housing because diarrhea can be a useful health indicator of cat welfare. However, in the study by Andersen et al. (2018), assessment of feacal consistency was rather difficult because it is more difficult to identify which cat has diarrhea.

As recommended by Vojtkovska et al. (2020), there are some ways to assess the presence of diarrhea in group housing, such as marking feces with commercially available concentrated food dyes (known as baking pastes). This was done in a study by Griffin (2002) in which cats ingested food dyes in canned cat food and the dyes served as fecal markers by imparting a specific color to each cat's feces that allowed identification in the litter box. This could be implemented in future studies, but it depends on the financial situation of the animal shelters and, of course, the desire to evaluate this parameter.

Regarding respiratory disease, our results show that only 3 cats in 3 shelters (1, 3 and 4) sneezed and only 1 cat coughed. In shelter 2 it was more difficult to assess which cats were sneezing because the investigator could not hear the cats due to the glass doors of each pen. The highest number of sneezing cats was found in shelter 5 (n=5), but according to the evaluator, many more cats sneezed and coughed there, although it was difficult to determine the exact number because they were constantly moving between indoor and outdoor areas. Perhaps other methods could be used in future assessments to better evaluate the incidence of respiratory disease, such as method recommended by Vojtkovska et al. (2020) for assessing upper respiratory tract infections, which we originally intended to include, but we did not have access or insight into this method. It is based on a 3-point scale, the degree of which expresses the severity of symptoms (1. no upper respiratory tract infection, 2. mild upper respiratory tract infection, 3. moderate to severe upper respiratory tract infection). The results on the presence of eye, nose and ear discharge showed that the highest number of cats with eye discharge was found in shelter 5, however, the sample of cats examined was too small. It is likely that this was due to the type of housing, as the cats were housed in groups where the incidence of respiratory disease is higher because the animals have more contact and therefore transmission of disease is faster (Turner et al., 2012). In shelter 2, one cat had bloody eye discharge, but according to the shelter manager, it looked like a sleepy cat.

5.   CONCLUSION

This pilot study represented the first study in which a protocol for assessing the welfare of cats was developed and subsequently applied in different Slovenian animal shelters. In addition, one of our goals was to create a protocol that would be accessible not only to animal shelters but to a wide range of usersand could be used in other countries as well. The results show that the protocol was useful, however we believe that the assessor was not appyling it in a well-trained way. Therefore, future assessor should be better trained and educated. Indeed, conducting the assessment in shelters has helped to improve and modifythe protocol, as through the assessment we have identified which methods are useful and which are not or could be improved. Additionaly, we would like to improve the graphic design of the protocol in the future, as our main idea was to design the protocol to be accessible electronically to the general public. As this is the first study to develop a protocol for feline welfare assessment, we believe that more studies are needed to refine the protocol. Thus, implementation of the protocol in other foreign animal shelters, as well as in other environments where cats live (cat hotels, dog and cat salons, cat cat caretakers' homes, veterinary clinics etc.), could further help improve the protocol.

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9.   **Appendix 1**

Welfare Assessment Protocol for Shelter Cats

WELFARE ASSESSMENT PROTOCOL FOR SHELTER CATS

SELF-ASSESSMENT FORM

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ACKNOWLEDGMENTS

SHELTER QUALITY. Welfare Assessment Protocol for Shelter Cats.

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University of Ljubljana, 2021

Logo: Ivana Plohl

Drawings and Graphic design: *Anja Rošker*

This document represents version 1 of the Shelter Quality Protocol.

PURPOSE AND AIM OF THE PROTOCOL

Animal shelters as organisations must always strive to improve and find ways to provide the best care for animals. Only then the level of animal welfare will increase, therefore, it is important that this type of formal document, such as our innovative and comprehensive protocol, exist. The protocol, as a professional tool, was designed specifically to be used in cat shelters, in order to assess the welfare of cats, using observational methods and tools, as well as behavioural tests.

One limitation of this protocol is that it does not allow a direct assessment of the quality of the shelter, because it does not provide a final grade and final score, which would provide information on what they do in the shelter in line with the welfare of cats and what not. However, forming the final score and calculating the actual quality of shelter via mathematical equations is possible, but this is not included, as this is not a priority and main aim of the protocol.

The main aim of the protocol is not just the assessment of the welfare itself in order to find weak points of an individual shelter regarding animal welfare, but also to educate and train shelter managers, shelter caretakers, veterinarians, cat owners, cat sitters, cat breeders, cat hairdressers and everyone else actively participating in the field of felinology, about cat welfare and ways to optimise it. With the right education on the specifics of a particular animal species, animals can be provided with adequate care, which leads to their stable mental and physical well-being. Animal welfare assessment is therefore essential in order to make changes within the individual animal shelter or any other environment where cats are housed. Additionaly, this protocol could help solve over-population and not enough space to house animals, because it would educate shelter caretakers about proper care and handling, which will result in less stressed and less fearful cats, as such cats are more likely to be adopted.

As previously mentioned, by the recommendation of the authors, the protocol can be used in many different contexts and settings, such as shelter settings, veterinarian ambulances, cat hotels, cat care salons and by all individuals who are actively engaged in the field of felinology and cat welfare, because the protocol combines different universally applied methods and tools for a broader and more accurate assessment of cat welfare, joining the medical/veterinary methods, as well as observational behavioural methods. However, it should not serve as an actual clinical diagnosis, as this one is developed by qualified veterinarians. Precise guidelines and instructions are integrated for the assessors, in order to reach the highest scores possible, regarding reliability, validity and feasibility, as well as, to facilitate an idea of the evaluation process itself.

Descriptions, definitions and parameters contained in this protocol have been developed on the theoretical and practical knowledge of the authors of this document. For the purposes of developing the protocol, we have also drawn on other, existing protocols, such as Welfare Quality Protocols, the Shelter Quality Protocol for Assessment of Shelter Dog Welfare, as well as on AWIN protocols for assessments of goats, sheep, turkeys, donkeys and horses. In addition to the protocols listed above, content from American

Society for Prevention of Animal Cruelty, Quality of life assessment guidelines, International Cat Care, American Association of Feline Practitioners and International Society of Feline Medicine helped us in the development of the protocol. The review paper by Vojtkovska was significantly useful to serve us, as a helpful guide in the protocol development, as they evaluated and reviewed different types of tools and methods for the welfare assessment of sheltered cats. They provided a list of methods and tools that could be used as part of the welfare assessment in shelter settings and added advantages and disadvantages of each method and tools.

HOW TO USE THIS DOCUMENT?

This document is not legally binding, therefore the details in the protocol cannot be used as evidence if any kind of conflict occurs.

The document consists of 5 main parts:

1.	**GENERAL INFORMATION ABOUT CAT WELFARE AND WELFARE INDICATORS** (resource/animal based)
2.	**PRELIMINARY INFORMATION** - information relevant for applying and carrying out the protocol
3.	**MEASUREMENTS OF THE PROTOCOL -** description, assessment, and scoring of the welfare indicators at the shelter, pen and individual level
4.	**AMPLING PRACTICAL INFORMATION** - step by step explanation of carrying out the assessment
5.	**ANNEX** - recording sheets to collect data

The authors of this protocol are not responsible for any damages or injury caused within the assessment, since this can occur as a result of applying the protocol and interpreting information contained within it. Each individual who acts as an assessor must take the complete and proper responsibility when conducting the assessment.

It is highly recommended to use feline-friendly handling techniques when conducting the assessment in order to reduce fear and anxiety, such as avoiding direct eye contact, moving slowly and deliberately, approaching from the side and not looming over the cat and using quiet voice.

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INTRODUCTION: CAT ANIMAL WELFARE

Animal shelters as facilities provide temporary housing for lost or abandoned cats (cats of the known owner), ill, injured, highly pregnant, feral (un-owned and unsocialised domestic cats), community/inbetweeners (cats that have higher levels of sociability, but are still able to live independently) and lastly, for cats that are brought by the owners. They aim to meet their nutritional, psychological, and physical needs, which contribute to a certain level of animal welfare. The quality of care should present an important and critical aspect of cat welfare in all facilities, which offer housing for cats.

What is Animal Welfare?

Animal welfare represents both the physical, as well as mental wellbeing of the individual. It includes not only the state of the animal's body, but also its feelings. There are various physical and social factors (environment, human attitudes and practises, available resources) that have an impact on one's well-being. These factors that can be incredibly stressful, especially for cats, can include different everyday husbandry routines, daily exchange of the volunteers, unpredictability of the staff workers, veterinary treatments and surgeries, the presence of unfamiliar people, presence of other animals, loud noises, inappropriate cage size, etc. The higher the occurrence of these negative factors, the higher are possibilities of impaired welfare of sheltered cats. Additionally, insufficient funding may be a factor causing a number of other potential animal welfare problems.

A relatively new animal welfare model was developed for welfare assessment, known as The Five Domains Model, which can be applied to all animal species and it represents the basis of setting norms of animal welfare, in our case for cat welfare. This framework is based on 5 elements, and can be assessed as the Table 1 below shows:

PHYSICAL/FUNCTIONAL DOMAINS

SURVIVAL-RELATED FACTORS   *SITUATION-RELATED FACTORS*

1: NUTRITION		2: ENVIRONMENT		3: HEALTH		4: BEHAVIOUR	
RESTRICTIONS OF	**OPPORTUNITIES TO**	**UNAVOIDABLE/IMPOSED CONDITIONS**	**AVAILABLE CONDITIONS**	**PRESENCE OF**	**LITTLE OR NO**	**EXCERCISE OF AGENCY IMPEDED BY**	**EXCERCISE AGENCY VIA**
Water Intake	Drink enough water	Thermal extremes	Thermally tolerable	Disease: acute, chronic	Disease	Invariant, barren environment (ambient, physical, biotic)	Varied, novel, engaging environmental challenges
Food Intake	Eat enough food	Unsuitable substrate	Suitable substrate	Injury: acute, chronic	Unjury		Congenial sensory inputs
Food Quality	Eat a balanced diet	Close confinement	Space for free movement	Husbandry mutilations	Functional Impairement	Inacceptable sensory impositions	Available engaging choices
Food Variety	Eat a variety of food	Atmospheric pollutans: CO2, ammonia, dust, smoke	Fresh air	Functional impairement: due to limb amputation; or lung, heart, vascular, kidney, neural or other problems	Poisoning	Choices markedly restricted	Free movement
Voluntary overeating	Eating correct quantities	Unplesant/storng odours	Pleasant/tolerable odours	Poisons	Body condition appropriate	Constraints on environment-focused activity	Exploration
Force feeding		Light: inappropriate intensity	Light intensity tolerable	Obesity/leanness	Good fitness level	Constraints on animal to animal interactive activity	Foraging/hunting
		Loud/otherwise unpleasant noise	Noise exposure acceptable	Poor physical fitness: muscle de-conditioning		Limits on threat avoidance, escape or defense activity	Bonding/reaffirming Bonds
		Environmental monotony: ambient, physical, lighting	Normal environmental variability			Limitations on sleep(rest	Rearing young
		Unpredictable events	Predictability				Playing
							Sexual activity
							Using refugees, retreat or defensive attack
							Sleep/rest sufficient

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5: MENTAL STATES

NEGATIVE	POSITIVE	NEGATIVE	POSITIVE	NEGATIVE	POSITIVE	NEGATIVE	POSITIVE
Thirst Hunger(salt) Malnutrtion malaise Bloated, over full, Gastrointestinal pain	Wetting/quenching pleasures of drinking Pleasure of different tastes/smells/textures Masticatory pleasures Postprandial satiety Pleasure of salt taste Gastrointestinal comfort	Forms of discomfort: Thermal: chilling, overheating Physical: joint pain, skin irritation Physical: stiffness, muscle tension Respiratory: breathlessness Olfactory Auditory: impairment, pain Visual: glare/darkness eye strain Malaise from unnatural constancy	Forms of comfort: Thermal Physical Respiratory Olfactory Auditory Visual Variety-related comfort	Breathlessness Pain: many types Debility, weakness Sickness, malaise Nausea Dizziness Physical exhaustion	Comfort of good health and high functional capacity Vitality of fitness	Anger, frustration Boredom, helplessness Loneliness, isolation Depression Sexual frustration Anxiety, fearfulnes, panic, anger Neophobia Exhaustion	Calmness Engaged, in control Affectionate sociability Maternally rewarded Excitation/playfulness Sexual gratification Secure/protected/confident Likes novely Energised/refreshed

Table 1: *The detailed elements of the five domains model. Adapted by Mellor et al (2020).*

As shown in the picture above, the first domain of the Five Domains model sets the standards for animals, where they must be fed properly (correct and variable diet, with correct quantities of food), as well as provided with water in order to normally function.

It is proposed that the environment or good housing must ensure physical, thermal, visual, auditory, olfactory and respiratory comfort, meaning, animals must be able to comfort themselves and be able to move freely and have space for spontaneous locomotion. They have to be provided with fresh air, available shade, conditions conductive to rest and sleep, as well as noise regulation. It has to be optimised in a way where animals are provided with essential resources for normal functioning. The third domain represents the normal health and functioning of the animal, meaning an individual must not be ill, sick, injured or in any kind of poor physical condition. The fourth domain represents expression of the species-specific natural behaviours. In order to achieve good welfare, individuals must have the opportunities in which they can express natural behaviours, as this highly affects their mental states. Therefore, it is important that sentient beings experience many positive emotions and avoid events, which would result in an increase of their negative emotions. They have to be able to exercise and have control within their environments, to explore, to forage, to interact with other conspecifics or people, as well as to play. The **last** domain represents the aggregates of all the other domains, as they all directly affect the mental well-being of an individual.

It is suggested not only to focus on each domain as an individual domain, but on all five domains altogether, as they intertwine and form a whole. Together they all affect one's wellbeing. In order to achieve optimal states of these concepts certain criteria must be met, on which the assessment of welfare is usually based. Since merely minimising or resolving negative physical or mental states does not necessarily result in positive welfare, but may only provide, at best, a neutral state, animals need more than this, to have good welfare. We need to be able to recognize their subjective emotional needs, not just meeting their basic needs.

MEASUREMENT OF THE PROTOCOL

Measurements in this protocol are taken on three main levels, as proposed earlier, such as:

- **The shelter** level (resource based),
- **The individual** level (animal based),
- **The pen** level.

SHELTER LEVEL	• General information • Social housing: types of accommodation • Health: Surgeries and control of pain • Mortality • Morbidity • Feeding
PEN LEVEL	• Space allowance • Environmental optimisation and availability of the resources • Water and Food supply
INDIVIDUAL LEVEL	• Interaction with humans • Emotional states and presence of stress • Quality of life • Hypothermic and hyperthermic behaviours • Diarrhea • Body condition • Muscle condition • Coat condition • Skin condition • Eye, nose and ear discharge • Respiratory disorders • Sickness behaviours • Pain assessment

Table 2: 3 Levels of the assessment.

RESOURCE BASED MEASUREMENTS (input)

Animals have to be provided with the environmental conditions which not only allow, but actively encourage animals to engage in activities and express behaviours that are rewarding (playing, scratching, interacting with each other) and species specific. Conditions should prevent any cause of pain or injuries, but instead provide comfort and spontaneous, free movement.

Resource based measurements focus on the resources with which animals are provided, as well as on how animals are being handled and taken care of. The authors of this document enumerate resources, such as the pen size, arrangement and layout of resources, daily husbandry and management with included measurements, such as handling of the animals, cleaning, sanitation, availability of food and water, how animals are transported or how they are treated at the veterinary expert. More specific examples of resource-based measures and how to properly assess them are stated in the chapters below.

ANIMAL BASED MEASUREMENTS (output)

Animal based measurements are directly taken on the animals, two examples would be their behaviour and disease development. These two measurements, both reflect how animals feel in a certain environment and how they cope. Assessors must be properly trained in order to achieve valid and useful results.

As a part of performing measurements, certain indicators can be used. By the definition they are specific, observable and measurable characteristics that can be used to show changes or progress. Therefore, the authors of this document suggest to use 3 indicators, when performing animal-based measurements, such as **behavioural**, **physiological** and **health** indicators.

The most reliable animal-based measurements for welfare assessment are human-animal interaction, body, skin and coat condition, eye and nasal discharge, as well as ear discharge, lameness and injuries and coat cleanliness. The authors of this document recommend to not just perform resource-based measurements, but also animal based measurements, because combining and including them in the assessment can result in valid, feasible and reliable animal welfare assessment.

Behavioural indicators

The authors of this document describe how behaviour reflects an individual's subjective mental states, their positive or negative emotions that they experience and how an individual copes with the environment. Behaviour can thus be perceived as a valid indicator of good or poor welfare. There are different types of behaviours and activities which reflect either positive or negative emotions, such as basic behaviours associated with metabolic processes (feeding, drinking, elimination …), comfort behaviours (grooming, stretching …), social behaviours, behaviours used for communication

(scratching, marking, spraying, vocalizing ...) and many other species-specific behaviours (hunting, rubbing, hiding, climbing ...).

It is important to assess the behaviour on **three main different levels**, such as body language, facial expression and vocalisations, when focusing on the evaluation of a certain simple or complex behaviour.

Body language

Animals can not communicate verbally like humans; therefore, it is essential to search for the cues and signs, with which they do communicate with us. They do so, through their body language. Different positions of body parts, postures and movement reflect different emotional states, which also differ from species to species. Felines have different ways of expressing themselves through body postures and it is essential to take into consideration different body parts in order to create a whole picture of their internal states. There are eight observation points of body language to consider (Table 2):

BODY PARTS	WHAT TO OBSERVE?
OVERALL BODY POSTURE (and body tilt)	Is their body tense/stiff/relaxed? In which direction is the body tilted (down/up, forward/backward)? Is the cat distancing itself or approaching?
EYES	Are the pupils narrowed/constricted or dilated? Are the eyes relaxed (soft gaze) or is the cat blinking? Is the cat staring or avoiding eye contact?
EARS	Are the ears positioned upright/forward/neutral? Are their ears flattened and sideways or only flattened?
WHISKERS	Are the whiskers more down or up (pain scale)?
MOUTH/LIPS	Is the mouth open/closed/stiff/tense/relaxed?
TAIL	Is the tail tucked, relaxed/neutral (half-mast) or lifted (tail-up)? What is the exact movement of the tail?
HAIR COAT	Are there any signs of vibration on the haircoat?
CONTEXT	What is the environment/situation in which the cat is being observed? All sensory inputs – sights, sounds, smell – should be taken into account to provide the most accurate idea of how a cat might feel.

Table 10: Key points of body language observation and questions related to observations.

Facial expression

Facial expression is a form of nonverbal signalling using the movement of facial muscles. One study found that cat's affective states can be correctly inferred from their subtle facial expressions (without obvious cues such as mouth-opening and ear-retraction) and that cats have human-detectable facial expressions across a much wider range of affective states, positive as well as negative, than has been previously shown. In terms of cat welfare assessment facial expressions are useful tools for identifying affective states, especially if cats are showing no signs of other emotions or if their body is hidden. Therefore, the authors of this document recommend focusing on body language, vocalisation and facial expression simultaneously.

Vocalisation

The cat has evolved to communicate effectively with humans, by using specific vocalisations and by being able to distinguish between individual human vocalisations and human attention. Instead of creating new vocalisation types, it is more probable that the cat has modified the function of some of its vocalisations to communicate adequately with humans. Certainly, they will vocalise differently when in positive social interactions, as in opposition to antisocial interactions. In general, there are 12 sounds produced by felines when communicating with humans, depending on the context, mood or motives:

1. **MEOW** (mostly for humans)
2. **CHIRP** (arousal when watching the birds)
3. **PURR** (when content or in pain)
4. **HISS** (can be in combination with spitting or growl, distance increasing)
5. **DISTRESS CALLS** (kittens and mothers)
6. **TRILL** (something between meow and purr, greeting)
7. **HOWL and YOWL** (during conflict and mating period)
8. **SCREAM** (when scared)
9. **TOOTH CHATTER** (mimicking the sounds of their prey or excitement)

These types of vocalisations have to be included when measuring and conducting behavioural observations and behavioural tests, since they reflect an individual cat's internal state, with the combination of its body language and facial expression.

Physiological indicators

As the authors of this document describe, physiological indicators represent measurements taken on a physiological level, such as excrement and urine samples to measure the presence of chemical compounds (glucocorticoids and catecholamines), which reflect certain affective states and provide insights into physiological mechanisms. These chemical compounds represent stress hormones, secreted into the bloodstream, when the individual is in a stressful situation. In addition, immune measurements (presence and number of the lymphocytes, immune B or T cells) as well as the heart rate and respiratory rate measurements represent the physiological indicators. These indicators can act as a valuable supplement in combination with the other welfare indicators, such as behaviour and can achieve greater interpretation of how cats feel in a certain environment.

Since some of these methods are invasive, they can cause additional stress on the animal during handling or sampling. The authors of this document advise to search for less or non -invasive methods to be included within the assessment.

Health related indicators

The third category of animal-based indicators are health related and they all indicate deteriorating animal health, including impairment in cats body condition. Mortality and morbidity additionally both serve as health indicators, as they are both basis for good animal welfare and reflect the opposite if they are high.

The most common signs in shelter cats, reflecting impairment in animals' health and body condition are:

- **Upper respiratory tract problems/diseases** (usually evident by nasal and eye discharge),
- **Fur and skin impairments** (lesions, swellings, wounds, ectoparasites),
- **Gastrointestinal problems** (diarrhea, constipation),
- **General changes in body condition** (weight gain or loss).

This section provides brief, but essential information, to ensure that assessors are familiar with the work they will be conducting. It is important that they know how to organise themselves before the visit, in terms of who and when to contact, in terms of the veterinary-sanitary order as well as how to present the protocol so that the assessment will be conducted with useful and reliable results. They should be familiar with how to behave properly and professionally in the shelter.

Before visiting the shelter, each assessor should have **knowledge** and **information** about:

- PRINCIPLES OF THE PROTOCOL (how it works)
- LIMITATIONS AND RESTRICTION IN THE PROTOCOL APPLICATION
- GENERAL KNOWLEDGE OF ANIMAL WELFARE
- CAT BEHAVIOUR AND HUSBANDRY PRACTICES
- CAT STRESS-FREE HANDLING
- MOST COMMON CAT DISEASES
- SHELTER ROUTINES (veterinary sanitary order) AND SHELTER GENERAL INFORMATION

Before the arrival assessor has to **contact the shelter manager/leader** and make an appointment in which assessment will take place. Each assessor has to ask for the general information such as:

- General shelter rules,
- Shelter safety rules,
- Veterinary sanitary order - information about daily routines of shelter staff and veterinarians,
- Facility design/layout or a **shelter map**,
- Number of cats, pens, disclosures, cages,
- Number of employees.

Protocol and assessment plans have to be **discussed with shelter manager** and **presented before the assessment takes place**, such as:

- Approximate assessment duration,
- Timetable and activities,
- **Type of measurements** (animal based and resource based),
- **Start and end of the assessment** (the assessment starts when the assessor/experimenter enters the room and positions her/himself in front of the first pen and starts recording and observing. The assessment ends when the last pen is observed by the assessor).

1   EQUIPMENT

Each assessor has to use the proper and required equipment to ensure the results of the evaluation will be valid and reliable, as well as the assessment will be feasible. Additionally, the assessor should wear **inconspicuous** and **neutral** clothes, not to influence the cats, their behaviour and consequently the results, as a response to the novelty.

Required materials, proposed by the authors of this document, are:

- PRINTED RECORDING SHEETS (score sheets),
- TABLET or SMARTPHONE,
- PENS or PENCILS,
- MEASURING TAPE,
- STOPWATCH (phone),
- CAMERA (mainly for long-term assessments),
- DISINFECTANTS,
- PROPER CLOTHING (biosecurity),

2   BIOSECURITY

It is important that assessors secure animals in the shelter in a way, where they do not make appointments if feeling sick or if they have a confirmed specific medical condition. Assessors should never be a potential disease-spreading source, or be seen as such. Before entering the shelter areas, additionally, they should always wear **protective clothes** such as:

- SAFETY SHOE COVERS,
- FACE MASK (avoid wearing sunglasses),
- GLOVES (if required),
- CLEAN OVERALLS (protective gowns).

Before entering individual shelter, **disinfection of footwear, as well as hand sanitation is mandatory.**

3   PROPER BEHAVIOUR OF THE ASSESSOR DURING THE ASSESSMENT

The authors of this document propose:

Assessor must be informed of how to properly and respectively behave in shelters on the days of the assessment, as improper behaviour can affect the animals, and consequently the results of the assessment.

Prepare everything ready for the evaluation before positioning in front of the pen. The assessor should stand in front of the pen, 2 meters from the fence, still, passive, making no loud noise and not interacting with the animals unless required by the protocol. When interacting with the animal, the assessor should keep a neutral, relaxed posture. If the animal is showing excessive

fear or distress the assessor should stop the assessment. When the number of animals housed together exceeds 5, or when the pen is large and animals are hardly visible, the assessor may enter the pen and carry out the assessment from inside. Procedures have to be followed as described, however people and cat's SAFETY has to be a priority.

- Always close the doors behind you
- Avoid speaking too loudly and making sudden movements
- Do not leave objects within reach of animals
- Avoid touching cats that show obvious signs of fear
- Keep focus on your work at all times
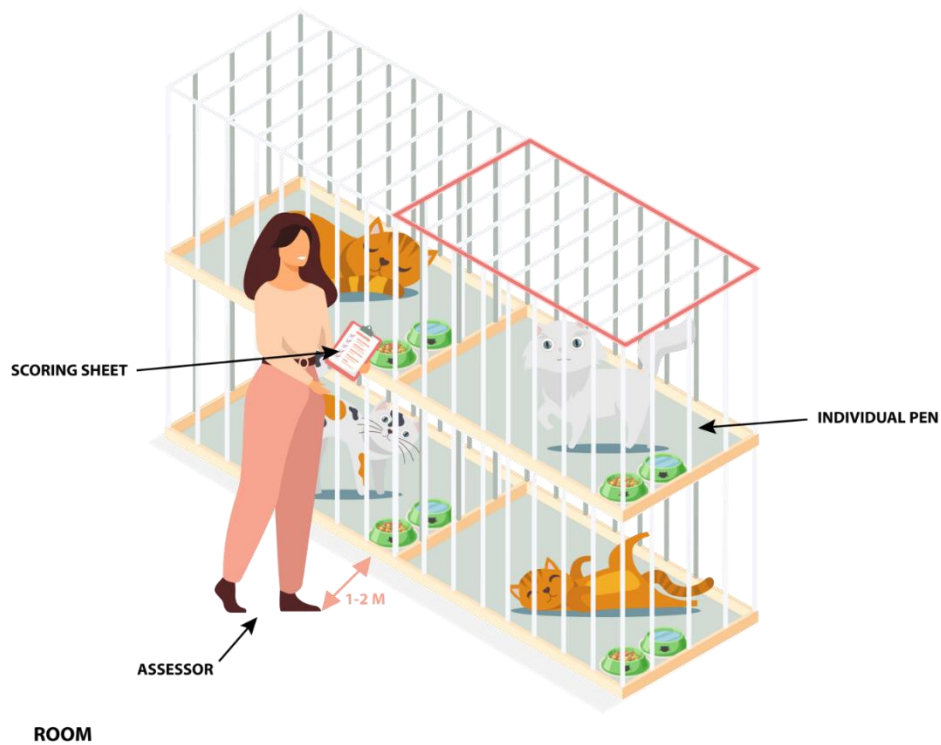
The authors of this document propose:

Before the assessment, each assessor should know: the correct number of housed cats, on the basis of which it carries out the **PROCESS OF RANDOM SELECTION** of the assessment pens.

Table 3: *Detailed selection process of pens and cats for welfare assessment*

SELECTION PROCESS	DESCRIPTION
SELECTION OF PENS	**Randomised** (for instance using any kind of **research randomizer** available online)
SAMPLE SIZE	At least **thirty** cats and **six** pens/living pens.
SAMPLE AGE	Selection of cats, based on their age, should not be limited only on including the adult cats (juniors and seniors) for the assessment, but instead it should include:
Cats aged less than five months (kittens)	Behavioural repertoire of kittens differs from adult cats. Juvenile behaviour includes high energy levels, where kittens have a high play drive. They are curious about their environment, which they explore by sniffing, biting, climbing, and playing. Play enables kittens to develop their physical, as well as mental skills.
Cats aged from 6 months-2 years (juniors)	Cats aged more than five months (juniors) exhibit different behaviours as kittens. They reach their full size and become sexually mature, which is usually at 6 months of their age. This is usually the start of their adolescent phase, where their behaviour shifts from playful exploration to aggressive boundary testing. Most of their behaviours are controlled by the limbic system of the brain, therefore a lot of reward seeking behaviours can be seen.
Cats aged from 3-6 years (primes)	Cats aged from 3 to 6 years (primes) mature physically and behaviourally and are still active, with frequent bursts of play behaviours.
Cats aged 7 years and older (seniors)	Behavioural changes for highly mature cats or »seniors« are common and they might appear due to underlying medical

	problems. At this life stage, they become less active and play levels decrease. However, normal ageing changes, which affect the behaviour of older cats include cognitive dysfunction, sensory decline (decline in hearing and vision), joint dysfunction, as well as altered sleep-wake cycles. All these changes can lead to subsequent fear, phobias, aggression, increased vocalization, low energy levels...
TIME OF ASSESSMENT	The full assessment of the shelter should be carried out on a single day. In case of adoption processes, parts of assessment can be considered.
FORMS FOR EVALUATION	Practical forms for evaluation (annexes) can be found in the last section of this protocol and printed for data collection.

Two factors that contribute to deviations in shelter behavioural assessment are **age** and the **season**. It is therefore advised to implement the assessment when the shelter has a sufficient number of cats (-critical mass)-, which is usually between the end of the summer and the beginning of the autumn.

Most measurements on the shelter level are **management/resource based**, since animal shelter as the unit provides all the necessary resources and inputs for the housed animals. Responses of the sheltered cats are based on the quality of their environment. Shelter managers should be involved in evaluating and recording these measurements.

The assessed resource-based measurements, adapted by Welfare Assessment Protocol for Shelter Dogs are the following:

- GENERAL INFORMATION
- SOCIAL ACCOMMODATION
- SURGERIES AND CONTROL OF PAIN
- MORTALITY AND MORBIDITY
- FEEDING

Annexes (ANNEX 1-2) for making records can be found in the last section of this protocol.

GENERAL INFORMATION

Before the assessment, the authors of this document recommend gathering the general information about the shelter as a facility, as it is written in the paragraph above (- Preliminary Information section-).

WHAT TO RECORD:

- The identification of the shelter.
- Name of the assessor.
- Day of the assessment.
- Number of cats in the shelter on the day of the visit.
- Microclimate of the environment (temperature and humidity).
- Presence of animal checklist for monitoring in the adoption area and the quarantine area.
- Shelter response time.
- Information about the staff and their work (competence, number of caretakers in the shelter, number of cats per caretaker).

HOW TO RECORD

The authors of this document propose to make recordings in such manner:

Ask the shelter manager to provide the required records which contain the general information, information about the number and size (group-housed environments and individual pens), information about health, mortality and morbidity. Certain points of the general information (temperature, animal checklist) and social accommodation can be additionally assessed **by**

observation as well. The assessor should select an observational point that allows a good view in order to properly count the number of available pens and resources within the pens.

When recording, use the scoring sheet (ANNEX 1).

SOCIAL HOUSING: TYPES OF ACCOMMODATION

The authors of this document, have proposed explanatory statements in the Table 4, in order to make it easier for the assessors to understand this section of the protocol and recordings.

Table 4: Definitions of different types of accommodation for better understanding of the assessors

SOCIAL HOUSING: STATEMENTS	DEFINITION
Individual pen	Defined as a room, a prefabricated element or a fixed shelter that has closed vertical walls and a roof. It should be insulated, and screen from adverse weather conditions (e.g., rain, strong wind. It represents individual living internal environment in which cat can come into contact with other animals.
Isolation/hospital pen	It represents individual internal living environment in which a cat cannot come into contact with other animals. Only veterinarian and shelter caretakers have access to the isolation pen. (Separation and recovery)
Group-housed environment	Represents an internal environment in which more than 2 cats are housed together.
Maximum group size	Represents the maximum number of cats housed in group-housed environments.
Separate accommodation	Represents separate accommodation of two different animal species (dogs and cats). For example, cats are housed in pens of a facility, which are separated from dogs. This way shelters reduce exposure of dogs and cats to additional stress. If a cat is housed in a pen next to a dog, its barking can cause a lot of additional stress on a cat.
Area	A part or a section of a larger place (in this case of an animal shelter).

Outdoor area	Represents an open external environment around the internal environment with a roof, into which cats can enter from the individual or isolation pen. It allows movement and interaction with the surroundings outside. These environments increase visual, olfactory and auditory stimulation.
Adoption area	It represents a section of an animal shelter where cats that are ready for adoption are housed.

WHAT TO RECORD:

- Total number of pens.
- Number of individual pens (single pens).
- Number of outdoor pens.
- Number of isolation pens (quarantine).
- Number of hospitalized pens.
- Number of group-housed environments.
- Total size of individual- and group -housed environments.
- Maximum group size of group housed cats.
- Compatibility of species (separate accommodation of cats and dogs) and presence of the sound barrier.

SCORING INDICATIONS:

Percentage of each type of housing in the shelter (%).

HOW TO RECORD:

The authors of this document propose to make recordings in such manner:

Ask the shelter manager or check by observation on the total number and size of individual pens and group housed environments of the shelter. The assessor should select an observational point that allows a good view in order to properly count the number of available pens, using score sheet (ANNEX 1).

HEALTH: SURGERIES AND CONTROL OF PAIN

Surgeries and other invasive procedures can cause stress to cats; thus, it is essential to implement management procedures which cause as little stress and pain as possible. Therefore, animal shelters must use anaesthesia in all such procedures, as well as analgesics after clinical interventions. Post-surgical daily monitoring should be implemented into the health status of each housed cat. Injured, ill or cats that underwent a surgery, should be housed separately, in hospital pens.

WHAT TO RECORD:

- Presence of operating procedures for post-surgical monitoring.

- Presence of protocols of analgesia.
- Availability of goods which help to reduce and relieve pain after the surgery (-boxes, closed beds, thermophores …).

HOW TO RECORD:

The authors of this document propose to make recordings in such manner:

Ask the shelter manager to provide the required records which contain the information about surgical procedures and control of pain within those procedures. When recording, use the scoring sheet (ANNEX 1).

MORTALITY

In medical settings mortality represents death. Measures done on the mortality level can be a good indicator of the welfare of sheltered cats, since an increase in the number of deaths can indicate a poor welfare of housed cats. Data from shelter records should be included in the assessment, if possible.

WHAT TO RECORD:

- The number of euthanasia because of health problems during the last 12 months.
- The number of euthanasia because of behaviour problems during the last 12 months.
- The number of deaths (other than euthanasia) during the last 12 months.
- Cat shelter population (mean number of animals in the last 12 months).

HOW TO RECORD:

The authors of this document propose to make recordings in such manner: Ask the shelter manager to provide the required records which contain the information about mortality. When recording, use the scoring sheet (ANNEX 1).

SCORING INDICATIONS:

- Percentage of adult cats death because of health problems (%)
- Percentage of adult cats death because of behaviour problems (%)
- Percentage of young cats death because of health problems (%)
- Percentage of young cats death because of behaviour problems (%)

- Percentage of adult and young cats death because of other problems (%)

MORBIDITY

Another indicator of good or poor welfare can be the rate of morbidity, which in medical settings represents illness or disease. This information should be provided by the shelter manager and included in the assessment, when possible. Higher the occurrence of the disease, the higher is the number of medical expenses, the poorer the welfare of cats.

WHAT TO RECORD:

- Total expenses for medical treatment in the last 12 months.

HOW TO RECORD

The authors of this document propose to make recordings in such manner:

Ask the shelter manager to provide the required records which contain the information about morbidity. When recording, use the scoring sheet (ANNEX 1).

Cats must be provided with sufficient food daily to function normally and to meet their basic needs, as well as the welfare criteria of absence of prolonged hunger. Diet must meet individual basic needs, additionally it should be tailored to individuals with specific health problems and age.

Table 5: Information recorded by assessors under feeding assessment

WHAT TO RECORD	DESCRIPTION
TYPE OF DIET	Animals are provided with different types of diet, such as dry pellets, cooked food, wet food or raw food and mixed food. Mixed food represents a mixture of different types of kibble.
SPECIAL DIETS FOR DIFFERENT AGE GROUPS	Cats should be anticipated with a diet according to their age (kittens, seniors) and special needs (hospitalised, sterilised/neutered).
FEEDING REGIME	Cats are fed either once or twice per day, or they have free access to the food source available all the time (ad libitum).
PERSON FEEDING THE CATS	Cats are fed by the staff members or by volunteers.
FOOD STORAGE	Food is stored appropriately, depending on the type. For example, wet food (after opening) should be always stored in the fridge and used within the couple of days.

HOW TO RECORD

The authors of this document propose to make recordings in such manner:

Ask the shelter manager to provide the required records which contain the information about records proposed in the Table 5 above. When recording, use the scoring sheet (ANNEX 2).

MEASUREMENTS SCORED AT THE PEN LEVEL

Most of the measurements completed at the pen level are evaluating and focusing on the resource-based measurements however, some of them are animal based. Before the assessment the assessor should get to know the cat's environment (a day or two before the assessment), so that the cats adapt/accustom to the unfamiliar human's presence in order to avoid variations in the results. The assessor will evaluate the resources within the pen, all cats will be observed for approximately one minute for recording animal-based measurements (-behavioural observations). Therefore, pain and health will be recorded on the pen level, whereas others on the individual level.

The assessed measurements scored at the pen level, adapted by Welfare Assessment Protocol for Shelter Dogs are the following:

- SPACE ALLOWANCE
- ENVIRONMENTAL OPTIMIZATION AND RESOURCES
- WATER AND FOOD SUPPLY
- ENVIRONMENTAL MICROCLIMATE (VENTILATION SYSTEM)

Annexes (ANNEX 3-6) for making records can be found in the last section of this protocol.

SPACE ALLOWANCE

All cats should have enough space to freely move, express their behaviour, socially interact with other conspecifics, and accommodate environmental optimisation (- such as bedding, cat toilet, water and food bowls, toys …).

WHAT TO RECORD

- Size of the individual pens (width, length, height).**
- Size of the group housed environments (width, length, height).
- Maximum group size (depends on the law).
- The number of animals in each pen.
- The presence of an outside area.
- The number of doors in outdoor areas.
- Sharp corners in the pen.

** Flexibility according to size and age – Kittens have enough space in minimal standards, whereas pens of the older cats could be improved in order to improve their welfare

Table 6: Information recorded by assessors under space allowance assessment

WHAT TO RECORD	DESCRIPTION	RECOMMENDATIONS
NUMBER OF DOORS IN OUTDOOR ENCLOSURE	Number of doors in the outdoor enclosure should have 2 cat doors in group housings.	Ideally, more doors, the better, as this would decrease the occurrence of conflicts between cats.
SHARP CORNERS IN THE CAGE	Sharp corners do not allow cleaning in cages, which in turn affects the development of bacteria, in addition, increases the chances of injury to animals.	Round edges would be more suitable for easier cleaning.
SIZE OF THE PEN		
WIDTH	Width is defined as the distance across something from one side to the other.	According to the European Directive each adult cat should have at minimum 2 m of width. As this is a minimum standard, it is recommended to allow cats more width, in terms of well-being and expression of their natural behaviours.
LENGHT	Length, by the definition, is used for identifying the size of an object or distance from one point to another.	According to the European Directive each adult cat should have at minimum 2 m of length. As this is a minimum standard, it is recommended to allow cats more length, in terms of well-being and expression of their natural behaviours.
HEIGHT	The distance from the bottom to the top of a certain object.	According to the European Directive each adult cat should have at minimum 2 m of height. As this is a minimum standard, it is recommended to allow cats more height, in terms of well-being and expression of their natural behaviours.

The authors of this document also suggest taking into account the types of housing (-individual, group). Several findings show some welfare issues regarding cat housing. Group housing itself can be a source of stress for timid, very old or very young cats. Similarly, cats that are poorly socialised to other cats typically experience   stress when group housed.

However, one study has shown positive effects of group-housed cats, as group housing itself is a form of social and environmental enrichment. Cats housed in an enriched group-housed environment showed less stressful behaviours (fear, anxiety, aggressive and destructive behaviours, pica, hypervigilance …), than cats which were housed alone or in basic group-housed environments, which did not offer any enrichment. This showed that group-housing does not necessarily cause a lot of stress for cats, as long as the cats are properly socialised and they have enough opportunities to withdraw from each other when they wish to.

HOW TO RECORD:

The authors of this document propose to make recordings in such manner:

Ask the shelter manager to provide the information about the dimensions (- width, length, height) of individual pens and outdoor areas. It should be checked whether the cats are limited within their pen regarding their age and size (- kittens can normally move and function even in minimally standardised pens). Additionally, it can be assessed **by observation and use of the measuring tape.** When recording, use the scoring sheet (ANNEX 3).

ENVIRONMENTAL OPTIMISATION AND AVAILABILITY OF RESOURCES

The authors of this document propose, based on their practical experiences, that all cats should be provided with different types of environmental resources in order to express their natural behaviours, normally function and feel safe in their temporary homes. Resources have a major impact on cats' stress levels and help to reduce them. It is essential to provide these resources in individual pens, as well as in group housings, to reach a certain level of optimisation. Optimisation can be defined as an act, process, or methodology of making something (such as a design, system, or decision) as fully perfect, functional, or effective as possible.

Recommendations in Table 7 suggest how key environmental resources (feeding, drinking, toileting, claw scratching, play and resting/sleeping areas) should be available in multiple locations within a pen or outdoor area, either to provide separate access in group-housed environments or several choices for individual cats. Each key resource should be placed in its own location, separate from other resources. For example, these authors suggest a minimum of two resting areas, two feeding areas and two toileting areas.

Table 7: Information recorded by assessors under *environmental optimisation and resources* assessment

WHAT TO RECORD	DESCRIPTION	RECOMMENDATIONS
RESTING PLACE	Resting or sleeping place enables a cat to comfortably rest and sleep. Cat is provided with at least 1 sleeping place that is soft, warm and dry.	Given the shelters and their space restraints there should be at least as many resting places, sized to hold a single cat, as there are cats in an environment, as they are more likely to rest alone than with others. A cat should have a choice for the resource; for example, a minimum of two resting places.
HIDING PLACE	Hiding place represents a safe, private and a secure place (enclosed refuge), often in a raised location, that allows the cat to hide. It enables a cat to feel protected. Good examples of safe places are a cardboard box, a cat carrier, and a raised cat perch or a shelf.	Given the shelters and their space restraints there should be at least as many hiding places, sized to hold a single cat, as there are cats in an environment. However, in terms of increasing welfare, a cat should have a choice for the resource; for example, a minimum of two hiding places.
FOOD AND WATER BOWLS	Cat is provided with at least 1 food or water bowl. Additionally, it is appropriate if 2 cats share 1 food or water bowl.	Given the shelters and their space restraints there should be at least as many food and water, as there are cats in an environment. However, in terms of increasing welfare, a cat should have a choice for the resource; for example, a minimum of two food and water bowls.

TOILET/LITTER BOX	Toilet/litter box are essential for feline elimination behaviour, because they enable the cat to eliminate their wastes. Cat is provided with at least 1 litter box, sited away from feeding and resting areas.	Given the shelters and their space restraints there should be at least as many toilet/litter boxes as there are cats in an environment. However, in terms of increasing welfare, a cat should have a choice for the resource; for example, a minimum of two toilet/litter boxes.
SUBSTRATE	Substrate represents a material or substance which cats use for elimination behaviour. They use it to cover their wastes. Appropriate substrate (suitable materials) can improve the environmental microclimate, as it absorbs the gases excreted through the faeces.	Most cats prefer unscented and finely particulate clumping type litter. In terms of increasing the welfare of cats, it is recommended to use biodegradable litter, as it is based on wood fibres, which are soft to the touch and not coarse. This type of sand does not stick to the respiratory tract of cats, as clay sand does, for example.
TOYS	Play and toys offer cats opportunities for displaying predatory- type behaviours, which enable them to fulfil their natural need to hunt. Good examples of toys are those that move and mimic prey characteristics such as soft, feather or fur toys, balls, mice, toys containing catnip, food dispenser toys …	In terms of increasing welfare, a cat should have a choice for the resource; for example, a minimum of two toys. This reduces resource-based aggression between cats.
SCRATCHING MATERIAL	Scratching materials enable cats to groom their front claws, to stretch their muscles and	Given the shelters and their space restraints there should be at least as many scratching materials, as there are cats in an

	also to deposit their scent onto the surface (visual and olfactory marker) Cat is provided with materials for scratching such as wood, textiles, sisal …	environment. However, in terms of increasing welfare, a cat should have a choice for the resource; for example, a minimum of two scratching materials.
ELEVATED SURFACE	Access to an elevated area increases the cat's vertical space and allows it to monitor its environment. Perches should be wide enough and long enough to allow the cat to fully stretch. Good examples of elevated surfaces are a perches, shelves, cat trees, hammocks, climbing frames and raised walkways.	Given the shelters and their space restraints there should be at least as many elevated surfaces, as there are cats in an environment. However, in terms of increasing welfare, a cat should have a choice for the resource; for example, a minimum of two elevated surfaces.

HOW TO RECORD

A table of natural behaviours (Table 8) is added to help with understanding, which behaviours are normal and natural for cats. By knowing and understanding the natural behaviours of cats, we also know which resources they need to express these behaviours.

The authors of this document propose to make recordings in such manner:

Presence and quantity of environmental resources are assessed **by observation** from inside the group-housed environment or in front of the individual pen. Walk around the group-housed environment or stand 2 m in front of the pen and visually observe and check for the presence and the quantity of the resources (described and listed in the Table 5). When recording, use the scoring sheet (ANNEX 4).

Table 8: Detailed description of normal and natural behaviours of cats

BEHAVIOUR CATEGORY/ACTIVITY	BEHAVIOUR	DEFINITION
METABOLIC PROCESSES (MAINTENANCE BEHAVIOUR)		
	FEEDING and ANTICIPATION of food	Cat feeds directly from the food source with her mouth or by using the paw. If the cat responds actively when presented with a food source, this is a sign of good appetite. Some cats dig after their meal (as they would try to hide their prey from others), which is not something abnormal.
	CHEWING	Cat chewes food source or cat grass, using its teeth, if resources are available.
	DRINKING	Cat drinks directly from the water source using its tongue or drinks by using its paw.
	(SQUAT) URINATION	Cat steps into its toilet/litter box without any problems or pain, digs with its forepaws to create a depression in the underlying substrate then squats and deposits urine into the substrate. Cat can easily turn around within the toilet/rando. After the elimination procedure a cat usually covers urine covered with soil or litter, using its hind feet. This is also known as raking/scuffing/ (although it is normal for them not to always fully dig their secretion) due to hygienic reasons or to minimise the likelihood that the olfactory information they contain will be detected by another cat.
	DEFECATION and DIGGING	Defecation behaviour enables cat to eliminate solid wastes. Cat steps into its toilet/litter box without any problems or pain, digs with its forepaws to create a depression in the underlying substrate and then squats and deposits faeces onto the substrate. Cat can easily turn around within the toilet/litter box. After

		the elimination procedure cat digs the faeces into the substrate (although it is normal for them not to always fully dig their faeces), due to hygienic reasons or to minimise the likelihood that the olfactory information they contain will be detected by another cat.
	SCUFFING/SCRAPING/RAKING	This behaviour is often exhibited during squat urination, but can also occur alone. It may be a method of transferring scent from the glands of the feet to the substrate. Cat uses its hind feet to scrape the urine within the toilet/litter box.
GENERAL ACTIVITY (LOCOMOTION)		
EXPLORING/INVESTIGATING	SNIFFING, NIBBLING, LICKING, FLEHMEN, ACTIVE EXPLORATION, PASSIVE EXPLORATION	Cats curiously explores the environment by sniffing air, object, or another cat. Cat might smell the head, flank or tail of another cat (»sniff body«), or the peri-anal area of another cat (»sniff rear«). Cats can also nibble (using their teeth) or lick onto objects. Another way they investigate odours is by using their additional olfactory organ, known as Vomeronasal organ (VNO), by flehmen reflex. Here, their upper lip is raised and the mouth held partially open; this may persist for half a minute or more.
PREDATORY BEHAVIOUR	FOOD SEEKING	Cat is expressing sequences of hunting such as staring, stalking, chasing, running, jumping, rushing, and chittering.
	FOOD CAPTURE	Cat pounces (leaps) at food source or prey, manipulates the food source or prey, performs a kill bite or has food source or prey prey in its mouth.
	FOOD PREPARATION	Prey is being carried, shaken, licked, plucked and eaten by a cat.

	CRAWLING, WALKING, CANTERING, PATROLLING, ROLLING, STANDING, REARING (self-supported or object supported), CROUCHING, SITTING	These are the most common sequences of predatory behaviour, which are still found in our modern cats today.
COMFORT BEHAVIOUR Behaviours to preserve and maintain health care. Also known as sedentary behaviours.		
	GROOMING	Lick itself (auto-grooming) or other cat (allo-grooming) on any body part.
	STRETCHING	Cat scratches itself or onto an object.
	PLAYING	Cats shows signs of play behaviour, either by playing with other cats (social play) or by themselves with toys (solitary, object play).
	HUDDLING	Cats huddle together in close proximity (kittens), mostly to increase the feelings of safety, as well as to maintain their temperature.
	SLEEPING	Cats are in a natural state of rest, in which their eyes are closed and the beir body is inactive.
	RESTING (relaxed or tensed positions)	Cats are in a comfortable position, lying or sitting, with their eyes not fully closed.
	YAWNING	Cat opens its mouth which is accompanied by a long inspiration, with a brief interruption of ventilation and followed by a short expiration.
	SHAKING	Cat shakes the whole body in order to release tension in the muscles.

	KNEADING/TREADING	Cat pummels paws into objects or ground in a kneading motion with the claws either in or either out. This behaviour may include either the front or the back feet and is usually associated with the female during reproduction or kittens who stimulate milk production by this behaviour. However, even if not kittens anymore, adult cats knead as a sign of comfort, as this behaviour is rewarding and comforting for them.
SEXUAL BEHAVIOUR		
	LORDOSIS	This is a sexual behaviour, where a female cat crouches down and raises her hindquarters to present her genitals to a male when in a receptive oestrous state. Her tail is turned aside and her belly close to the ground.
	MOUNTING	One cat attempt, but fails to achieve, intromission. The mounting cat normally holds the recipient firmly with its mouth, at the nape of the neck whilst mounting (also known as »nape bite«. It is sometimes accompanied by treading movements of the hind legs.
COMMUNICATION		
Cats communicate through visual, tactile, olfactory and auditory means.		
	VOCALISATIONS (auditory communication)	Cats purr, trill (chirrup) or meow (greeting call) during contact with another individual. Purring is a ubiquitous vocalisation among cats and is produced both inhalation and exhalation, therefore it sounds as a continuous vocalisation.
	SCRATCHING (olfactory and visual communication)	Scratching serves to groom and condition the front claws, as well as to stretch their muscles. leave visual and olfactory markers. When cats scratch on surfaces, this results not only in a clear visual marker for other cats, but also

		results in depositing olfactory markers on the surface since scent from the glands on their paws (interdigital glands). Is deposited on the surface.
	NOSE TOUCH/ (tactile communication)	Used as a greeting. Cat approaches another cat and they touch their noses gently. This is probably accompanied by »sniff nose« (two cats sniff each other's noses). Nose touch is another way, how cats transfer scent between each other and gather information about one another.
	RUBBING (tactile communication)	Cats are rubbing against their conspecifics (cat-cat rubbing, »social rubbing«), objects, or humans with their body parts (head, flank tail) which contain several skin glands, from which secretions are excreted into the environment. This tactile and visual behaviour results in the exchange of odours between the cat and its environment. It is also associated with female sexual behaviour.
	URINE SPRAYING	Also known as scent marking is a behaviour performed by spraying, in which the cat backs up to a vertical surface, and urinates backwards usually while quivering its tail. In contrast to urination, here, only a small amount of urine is deposited on vertical surfaces. Pawing after spraying is really rare or very seldom.
	SLOW BLINK (visual communication)	"Slow blinking" is a term used to describe when cats hold their eyelids almost closed and perform a slow wink in one or both eyes. It typically involves a series of half-blinks and eyelid narrowing. It is considered the ultimate signal of trust.
	ROLLING (visual communication)	Rolling is a component of female sexual (proestrus) behaviour, where it is usually accompanied by purring, stretching and rhythmic opening and closing of the claws, and is interspersed with bouts of object-rubbing.
SOCIAL INTERACTIONS	INTERACTIONS WITH HUMANS	

POSITIVE	APPROACH BEHAVIOURS	Cats are searching for direct contact with humans usually by approaching and rubbing against them, or by simply staying in their proximity. Approach behaviours usually involve a cat's tail being held vertically (tail-up, TU), because it has been shown in studies that vertical tail signals an intention to interact amicably. When approaching humans, cats might purr, meow (greeting behaviours), and they are not avoiding eye contact, as mutual gazing between cats is usually interpreted as a threat signal.
NEGATIVE	FIGHT/AGGRESSION	Cats can attack in a defensive manner when they are cornered, if they feel their safety is threatened, or in a knee-jerk reaction to rough handling, such as tail pulling etc. Aggression usually results from a high state of fear or anxiety. Behaviour is present such as biting, hissing, spitting.
	FLIGHT/ AVOIDANCE	Fearful cat will often try to escape a situation by fleeing; this may be obvious by a sudden exit from the current environment, but also can be more subtle (hides behind an object). Animal is not staying in proximity and is avoiding eye contact. Their body is stiff and tensions in the face is present.
	FREEZE	Cats will either stand very still or move in what appears to be slow motion. The cat is terrified and frozen, thereby accepting examination or manipulation.
	FIDGET	Can be defined as uneasiness or restlessness as shown by nervous movements. It includes behaviours such as lip-licking when not hungry, yawning when not tired, scratching when not itchy, visually scanning the room or shaking the coat as if wet. These behaviours are inappropriate or out of context relative to the animal's situation.

	HIDING	Cats is hiding behind/under an object (bedding, box).
	VOCALISATIONS	In terms of aggressive interactions, cat might be hissing, spitting, yowling or growling.
SOCIAL INTERACTIONS	INTERACTIONS WITH CONSPECIFICS*	
POSITIVE	APPROACH BEHAVIOURS (distance enhancing behaviours)	Cats approach one another with tail up (TU), they stay in close proximity and rub against each other. This is also called a »social rub«. They may sit next to or very near to, another cat, also known as »Sit With« behaviour. Cats may also lie with part of the body in contact with another cat.
	SOCIAL GROOMING/ ALLOGROOMING	Cats are cleaning and maintaining the appearance of other cats by licking each other.
	SLEEPING/HUDDLING	Cats lie together and sleep close to another one.
	SOCIAL PLAY	Social play has been divided into contact social play and non-contact social play. Contact social play has been also known as »jostle play«, where a cat struggles with another cat, raking with its hind legs and pulling the opponent towards its body with its forepaws.
NEGATIVE	REDIRECTED AGGRESSION	If a cat is highly aroused by an outdoor cat or other animal, the cat may redirect that aggression toward anyone nearby.
	PLAY AGGRESSION	Represents aggression which occurs usually during kitten play, when they play roughly. This enables them physical and mental development.
	INTER CAT AGGRESSION	Represents the aggression between cats within the same household. It is most likely to occur when a new cat is introduced to a household, a resident cat has

| | | been absent and returns to home (after veterinary visit) and when there is competition for resources (litter boxes, food and resting areas). |

Water and food are the most important supply resources without which the individual animals can not survive. Therefore, it is important that cats have fresh water and food available for normal growth and development. Although the brand of the food for an individual animal in shelters varies on a daily basis, as the purchase and amount of food depends on finances and donations, it is better for cats to have a food source than to have none.

Table 9: Information recorded by assessors under *water and food supply* measurements

WHAT TO RECORD	DESCRIPTION	RECOMMENDATIONS
PRESENCE AND AVAILABILITY OF WATER BOWLS	Water bowls are provided within the pen or group housed environment.	There should be at least one water container per cat in the household plus one extra' in various locations away from food.
PRESENCE AND AVAILABILITY OF FOOD BOWLS	Food sources can be provided via different types of food bowls, automatic feeders or interactive feeders and toys.	Ideally each cat should have access to its own food bowl. Providing individual eating locations allows for the privacy needed to prevent the stress associated with feeding competition.
TYPES OF WATER BOWLS	Water sources can be provided via different types of water bowls, automatic fountains or glass tumblers.	Pet drinking fountains and even glass tumblers are popular drinking vessels for cats but regular bowls can also be attractive if they are presented appropriately and are large enough that your cat can drink without touching its whiskers against the sides.
MATERIAL OF A BOWL	Bowls can be made out of different materials such as plastic, ceramics or stainless-steel.	Ceramic or glass food bowls are probably the most sensible choice as plastic receptacles scratch easily and can give off a slight odour that your cat may not like.
HYGIENIC WATER SUPPLY	Hygienic water supply is considered, when the drinking places and water are visibly clean, absent of any dirt, faeces, or moulds.	Few times per day, water sources should be replaced, to ensure hygienic standards. This also increases the frequency of drinking.
HYGIENIC FOOD SUPPLY	Hygienic food supply (kibble, wet food) is considered when	Food sources must be regularly checked and changed if necessary.

	the feeding places and food sources are visibly clean, absent of any dirt, faeces or moulds.	Leaving wet food or kibble available can lead to spoil.
APPROPRIATE DISTANCE BETWEEN THE BOWLS	Water and food bowls should be placed separately, with the distance (as much as the environment enables) for hygienic reasons.	Resources such as food and water bowls, should be separated from each other so that cats have free access without being challenged by other cats or other potential threats. They should be separated from each other at least 1 m apart.

HOW TO RECORD

The authors of this document propose to make recordings in such manner:

Water and food supply is assessed **by observation** from inside the pen or group housed environment. Enter the enclosure (pen/ group housed environment) and check, using the score sheet below (ANNEX 5).

ENVIRONMENTAL MICROCLIMATE

The ventilation system and quality of the air is important, such as the temperature, humidity, other toxic gases, the amount of dust, and the amount and type of microorganism, and airiness, because they affect the normal functions of the cat, such as their metabolism.

It is important that animals are protected from weathering (properly insulated walls and roof), such as draft and that they have the access to daylight.

WHAT TO RECORD

- The environmental temperature (° C).

- Exposure to weather/outdoor conditions (draft).

- Accessibility of daily light.

HOW TO RECORD

The authors of this document propose to make recordings in such manner:

Ask the shelter manager to provide the information about the environmental temperature of each room in the shelter. Assessors can also check the temperature of the environment by themselves, if any thermostats or thermometers are available in the environment. When recording, use the scoring sheet below (ANNEX 6).

MEASUREMENTS SCORED AT THE INDIVIDUAL LEVEL

The following guidelines, proposed by the authors of this document, should be followed to perform the assessment:

- The age of the cats selected for the evaluation comprises 4 age **categories (kittens, juniors, primes and seniors).**
- Ideally cats that have been in a shelter for at least a month should be assessed however, those cats that do not meet this condition can also be selected, as this increases the sample size.
- Cats should be selected at random (randomised selection).
- Assessment should include at least 6 pens and at least 30 cats all together, in the case of larger shelters.

Most of the measurements scored at the individual level can be categorised as animal-based measurements, since they include observations of animal behaviour and responses to the environment in which they are housed. Not only **behaviour**, but other indicators are included such as **health** (physical condition of the animal) and **physiological** indicators, that both reflect an individual's adaptation to the environment.

Annexes (ANNEX 7–24) for making records can be found in the last section of this protocol.

BEHAVIOUR

The authors of this document write how animal behaviour can act as an indicator and a direct reflection of good or poor welfare, since it reflects an individual's subjective mental states, which emotions they experience and how they cope with the environment. There are different types of behaviours and activities which reflect either positive or negative emotions, such as basic behaviours associated with metabolic processes (eating, drinking, elimination …), comfort behaviours, social behaviours or interactions, behaviours used for communication (-scratching, marking, spraying …) and also behaviours that reflect negative emotions.

HOW TO ASSESS BEHAVIOUR?

With an addition to **behavioural observations,** as an implementation, certain tests can be performed, as authors of this document write. These tests show how cats respond to new and unfamiliar people in their environment. These are known as **approach tests**, with which we can assess the human-animal relationship of each individual. Additional and detailed instructions for evaluating and performing these tests are provided below.

The authors of this document propose:

Each animal will be observed by the assessor, standing in front of their pen; however, if the assessment will be performed on the group level, the assessor should be able to enter the group-housed environment and carry out the assessment from the inside. Shelter staff should allow the entrance to a pen, according to the cat's level of sociability, prioritising human and animal safety. If an animal shows excessive signs of fear, to avoid unnecessary stress, contact should not be forced. Checklists are a basis for the behavioural observations. Therefore, we have included different forms of checklists which can be found below, to evaluate and derive behavioural tests.

The assessed animal-based measurements, adapted from Welfare Assessment Protocol for Shelter Dogs and those, developed by the authors of this document, are the following:

- INTERACTION WITH HUMANS
- EMOTIONAL STATES AND PRESENCE OF STRESS
- QUALITY OF LIFE
- HYPOTHERMIC AND HYPERTHERMIC BEHAVIOURS
- DIARRHEA
- BODY CONDITION
- MUSCLE CONDITION
- COAT CONDITION
- SKIN CONDITION
- EYE, NOSE AND EAR DISCHARGE
- RESPIRATORY DISORDERS

- SICKNESS BEHAVIOURS

- PAIN ASSESSMENT

CAT-HUMAN INTERACTION

The most common methods to assess reactions towards humans and other animals are approach tests. They evaluate behavioural responses to novelties and unfamiliarity's and use to discriminate socialised from unsocialised cats. Their behaviour either reflects fearfulness or fearlessness. If a cat is constantly scared of other people and other cats, their stress levels are constantly increased, which negatively affects their welfare.

In general, there are **three types** of approach tests, all can be used for the assessment.

CAT APPROACH TEST

This method was originally formed in 1997, by Kessler and Turner to assess the degree of socialisation of cats, recognized as Human-Approach Test. It was used to assess the cats housed individually. In this document, a modified version of Cat Approach Test (Table 10) proposed by Arhant and Troxler is used. It is based on 2-point scoring; either cats want to make contact, or they do not. Originally it is performed in the group-housed setting however, the authors of this document suggest that the assessment is additionally made when a cat is housed alone.

Table 10: *Modified version of Cat Approach Test, used for welfare assessment*

WHAT TO RECORD	DESCRIPTION	OBSERVED BEHAVIOURS
NO CONTACT POSSIBLE	Cat flees, shows aggressive behaviour, or "freezes«.	Hiding, Freezing, Trying to escape, Avoiding eye contact, Hissing, Attacking.
CONTACT POSSIBLE	Cat stays at a distance of 20 cm, but sniffs in the direction of the assessor or the cat approaches the assessor.	Scenting in the direction of the experimenter, exploring the experimenter, sniffing and rubbing hand, rubbing the experimenter's legs.

Recording should be conducted as it was performed in the study by Arhant and Toxner, combined with the suggestions from the authors of this document. They included another observational parameter, that is the type of pen material, as it affects the interaction between the assessor and selected cat. There are 2 main types of pen materials, which can affect the conduct of the assessment itself. The material either allows, or does not allow direct contact (touching or sniffing the assessors presented hand) of the cat with the assessor. Commonly used materials are glass (for instance plexi glass or other similar materials) and metal mesh or there is no barrier present.

STEP 1: Enter the room and remain calm near the entrance for the first minute. If assessing the cat which is housed alone, approach to its individual pen in a slow, smooth motion and present your hand (stop if the cat is obviously withdrawing). If the assessment is made in the group-housed environment, enter the room and remain calm near the entrance for the first minute and then do the same as it is proposed for assessing the individual cat.

STEP 2: There should be 20 cm distance between the hand and the cat and no direct eye contact.

STEP 3: Wait for the cat to approach, afterwards choose the scoring options using ANNEX 7.

FELINE SPECTRUM ASSESSMENT

Feline Spectrum Assessment (FSA) was created by American Society for the Prevention of Cruelty to Animals for practical use in shelters. It consists of **four components** of the evaluation and serves to gather information about the level of socialisation in cats. It has been used to gather information about cats who enter shelters with an unknown history and see how comfortable they are with people.

FSA generally takes no more than **five minutes per cat per session** to complete. It may take up to four repetitions across three days (20 minutes total per cat) to complete this assessment; however, some cats will be identified as Likely to be Socialised or Extremely Likely to be Socialised after only one or two repetitions and will not need additional evaluation.

Cats who have not clearly shown that they are accustomed to people may show a **complementary set of behaviours** (Point Behaviours: Lip licking/Head facing) in the morning assessment. These behaviours provide additional insight into the likely level of acclimatisation to people.

Cats will be fed in the evening of all three days while in the FSA program. It is especially important for the cats to receive food on the evening of Day 1 and for the food to be left in their cage until the Day 2 morning assessment is complete. This is because the evaluator will need to score whether the "cat ate", "did not eat" or if it was "impossible to tell."

Less Socialized	Probably Less Socialized	Likely More Socialized	Very Likely More Socialized	
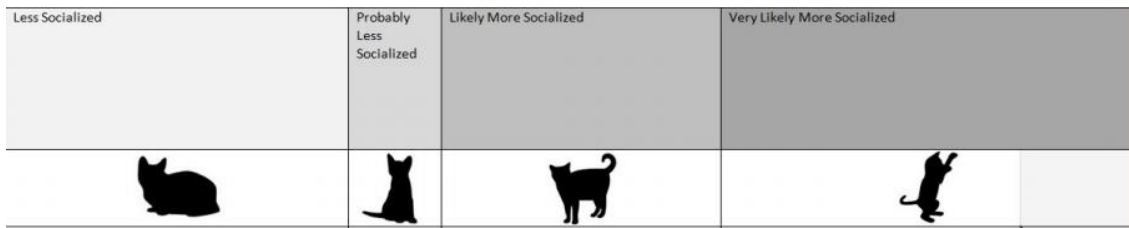
Figure 4: Four types of *socialisation levels of cats within the Feline Spectrum Assessment*

The **four components** of evaluation, that are based on their practical printable tools, are:

- GREET: The assessor evaluates whether a cat reciprocates and greets, or whether the cat avoids the interaction.
- HAND ON CAGE AND CRACKING THE CAGE DOOR: The assessor touches the cage door and eventually, slowly opens the door. This step can give more information about a cat's level of sociability toward people, since opening the cage door may signal an opportunity for cats to interact.
- INTERACTIVE TOY: The main job of the assessor is to present itself in front of the cage with an interactive toy. This enables the individual to respond and interact with the human, as the toy works as an encouragement.
- TOUCH WITH WAND: The assessor approaches the cage and uses the wand to physically interact with the cat.

ELIGIBILITY REQUIREMENTS FOR FSA:

- A place to hide **should not be provided** while testing takes place, because cats need to be visible between the assessment.
- Cats belonging to the age categories (juniors, primes, kittens and seniors) can be included in this assessment.
- Cats should appear in **good health** (obviously socialised, ill, injured or pregnant cats, should be **excluded).**
- Cats can participate if they have a chronic physical issue that does not affect their normal behaviour, such as one leg missing or one eye missing.
- Assessment takes place **BEFORE** morning cleaning of the cage and **AFTER** afternoon cleaning of the cage.
- **One hour REST** for cats between the repetitions.
- Cats have to be fed by the assessor across all three days in the EVENING.

- The presence of fifteen unique behaviours (available online).

The authors of this document also **propose** the assessment to be done by the shelter caretakers, who should be trained and familiar with the conditions and guidelines of the FSA. Therefore, it is highly suggested to read the online practical printable manual and to watch the video instructions, as a part of the training, before the assessment in the shelter.

Therefore, using an FSA manual found online, since it can take up to four repetitions across three days to be completed.

Manuals, which can be found online and printed are:

- **Printable manual for the FSA**: https://www.aspcapro.org/sites/default/files/ASPCA-FSA-manual-2016.pdf
- **Printable assessment sheets**: https://www.aspcapro.org/sites/default/files/ASPCA-FSA-assessment-sheets-2016.pdf
- **Printable checklist**: https://www.aspcapro.org/sites/default/files/FSA-3-checklist.pdf
- **Printable scoring examples**: https://www.aspcapro.org/sites/default/files/FSA-5-scoring.pdf

EMOTIONAL STATES AND PRESENCE OF STRESS

Emotional states represent the individual responses to the environment in which they are located. Therefore, it is essential to connect the inputs which are provided for sheltered cats and their outputs, more precisely, how they feel and respond to the given circumstances. This is essential, since chronic stress decreases the quality of cat's lives and their welfare.

Stress can be measured using two methods, either using Cat Stress Score or the Frustration, Anxiety, Stress scale for shelter developed by the Fear Free Shelter organisation.

CAT STRESS SCORE

Cat Stress Score is a rating system with a seven-point scale, developed by Kessler and Turner in 1997. It has been regarded as a static and subjective measurement of behaviours displayed over the short term. It measures the presence and level of stress in cats and their different types of behaviour in different environments. It has been used extensively to evaluate the level of welfare for cats in shelter settings.

Such scoring may be influenced by the housing system, as cats housed in traditional caging systems cannot be expected to be able to display the same range of behaviours compared to cats in group-rooms which allows more free movement.

WHAT TO RECORD

- Presence of body postures and behaviours, which reflect negative emotions and stress.
- Presence and frequency of these behaviours.

SCORING INDICATIONS:

Score below 3 is still acceptable (non-stressed).

HOW TO RECORD

The authors of this document propose to make recordings in such manner:

This is assessed **by observation**. The assessment should be carried out **at least once per day** after feeding and cleaning procedure, **by the same observer.**

Enter the room slowly and calmly, or approach the front of the pen and wait for the cats to habituate to your presence (5–10 minutes). Start observing each cat for approximately 1 minute. When recording, use the 7-point scale Cat Stress Score (ANNEX 9) and make no physical or vocal interactions. Make additional notes if necessary.

FAS was created for veterinary professionals, which offers the opportunity to be consistent in assessing and recording every cat's FAS level, and it gives the recommendations on how to proceed and improve an individual's mental state. There are 6 levels (0-5) and each of them represents active or passive signs of FAS. The higher the level, the higher are signs of FAS. Level 0 and 1 represent low signs of FAS, level 2 and 3 represent moderate signs of FAS, whereas level 5 and 6 represent high signs of FAS.

Most commonly there are 2 signs of stress, active and passive, described in Table 11:

Table 11: *Active and passive signs of FAS.* Adapted from original Fear Free Shelter Frustration Scale online manual (2019).

ACTIVE SIGNS:	PASSIVE SIGNS:
• High arousal	• Hiding
• Hissing	• Feigning sleep (pretending to sleep)
• Aggression	• Decreased locomotion and play
• Vocalising/meowing	• Hypervigilance
• Pacing	• Decreased grooming
• Pawing	• Decreased/poor appetite
• Escape behaviour	
• Hanging on the cage	
• Disruptive behaviour (cage contents)	

WHAT TO RECORD

- Occurrence and presence of active or passive signs of FAS.

HOW TO RECORD

The authors of this document propose to make recordings in such manner:

This is assessed **by observation**. Enter the room slowly and calmly, or approach the front of the pen and start observing each cat. Check for any presence of (active/passive) signs of FAS, listed in Table 12. When recording, use the FAS scale (found under ANNEX 10).

Table 12: 3 levels of Frustration, Anxiety, Stress scale for assessment. Adapted by the Fear Free Shelter Frustration Scale (2019).

WHAT TO RECORD			
ACTIVE AND PASSIVE SIGNS		ACTIVE SIGNS	PASSIVE SIGNS
LOW	MODERATE	HIGH	
NORMAL BEHAVIOUR PATTERNS	HESITANCE	HIGH AROUSAL	HIDING
FRIENDLY BEHAVIOUR	OCASIONAL MEOWING	HISSING	FEINING SLEEP/NOT MOVING
NORMAL EATING BEHAVIOUR	OCCASIONAL HIDING	AGGRESSION	HYPERVIGILANCE
NORMAL COMFORT/GROOMING BEHAVIOUR	OCCASIONAL PAWING AT THE CAGE DOOR	REPETITIVE MEOWING AND PACING	AVOIDING SOCIAL INTERACTIONS
NORMAL PLAY BEHAVIOUR	SLIGHT DECREASE IN APETITE	PAWING	DECREASED PLAY
NORMAL SLEEPING AND RESTING BEHAVIOUR	SLIGHT DECREASE IN EXPLORATION	PUSHING/HANGING ON THE CAGE	UNDER GROOMING/OVER GROOMING
RELAXED BODY POSTURE		ESCAPE BEHAVIOUR	DECREASED APETITE
APPROPRIATE SOCIAL INTERACTIONS		DISRUPTION OF CAGE CONTENTS	

QUALITY OF LIFE ASSESSMENT

For a cat quality of life refers to the state of a cat's life (as we imagine it perceives it) at any given time. This is a balance between the cat's positive and negative experiences. A cat with a good quality of life would have many positive experiences and have few negative experiences.

This document contains the Quality of life version proposed by the International Society of Feline Medicine, which consists of the Quality of life balance scale and a questionnaire.

The authors of this document propose that the assessment should be conducted by shelter **caretakers and certified breeders**, assessing the same cat (consensus is reached), as they spend more time together with the cats housed in the shelter on a daily basis than the other employees (veterinarian, shelter manager). Only cats that have been in the shelter for **seven** days, should be assessed. It is recommended that the assessment is performed

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repeatedly on the **same individual** in a comparative way (i.e., looking for changes over time that suggest a decline in positive and an increase in negative experiences, or vice versa.

WHAT TO RECORD

- Positive or negative experiences of a cat.

HOW TO RECORD

The authors of this document propose to make recordings in such manner:

The assessment involves solving the Quality of life questionnaire and using the Quality of life balance scale, available online (https://icatcare.org/app/uploads/2020/04/Quality-of-Life-Assessment-Guidelines.pdf).

Focus on the positive and negative experiences of each individual cat and evaluate which part of the balance scale would suit the cat's current experiences. Write the answers in the score sheet (ANNEX 11). Qol represents a subjective assessment, therefore every caretaker has to understand differences between individual cats and make an assessment based on what they consider that cat's experience of life may be.

OVERALL HEALTH STATUS

Shelters must aim to ensure the optimal health and physical conditions of each housed cat. They should be absent of any kind of disease, injury or pain. Therefore, proper monitoring is required. There are many ways of assessing overall health status. This protocol includes the following method:

1. KARNOFSKY RATING SCALE

KARNOFSKY RATING SCALE

One of the ways to rate feline health is using the tool named **Karnofsky Rating Scale (KRS).** It enables the clinical assessment of healthy cats that have been in the shelter for longer time, **such as more than 10 days**, by evaluating their normal activities and the progression of the disease. It also helps to establish a treatment and how it would affect the present disease.

It consists of two parts: the first part is the score given to the cat by the veterinarian (clinician's score) after assessing its state of health and body condition; the second part consists of a questionnaire containing questions about behaviours, which are answered by the owner.

WHAT TO RECORD

- Presence/occurrence of   any changes in the physical functioning of an individual animal.

- Occurrence of the decline in functional ability.

HOW TO RECORD

The authors of this document propose to make recordings based on online guidelines, in such manner:

<u>STEP 1:</u> Complete the scoring using KRS form (ANNEX 12).

<u>STEP 2</u>: Review KRS form and medical records to assess presence and extent of specific disease, signs and symptoms of each cat.

<u>STEP 3:</u> During assessment, observe the cat's subtle dependencies and interactions within the existing support networks.

<u>STEP 4:</u> Interview staff members/caretakers to obtain functional assessment information using questions.

<u>Online guidelines can be found here:</u>

- https://continuagroup.com/article/guidelines-for-use-the-karnofsky-performance-scale/

HYPOTHERMIC & HYPERTHERMIC BEHAVIOUR

Thermal comfort represents how comfortable an individual cat feels in its environment, regarding the temperature exposure. A cat can feel either cold (hypothermia) or hot (hyperthermia). Usually, thermal comfort is reflected through thermal behaviours, which help animals to manipulate their environments, influence heat flow between their bodies and the environment and thereby to gain thermal comfort. These thermoregulatory behaviours act in concert with physiological responses to thermal stressors, and the same kind of signals participate in both kinds of temperature regulation.

It is important for the normal functioning of the cats, as it affects their metabolism, movement, food intake, and can consequently affect their stress levels. If the cause for thermal discomfort is inappropriate room temperature, this leads to the environmental associated hypothermia (mostly in winter season) or hyperthermia (mostly in summer season). Shelter has to ensure the optimal temperature in each environment of the facility, as well as the optimal humidity and ventilation.

It can be physically assessed, using tools such as stethoscope, rectal thermometer or non-contact infrared thermometer. Heart and respiratory rate can both be physical assessed or visually assessed- through behavioural observations, focusing on the signs of potential hypothermia or hyperthermia.

Short questionnaire serves for the purpose of obtaining information about the environment itself. This gives a potential indication whether the conditions of the shelter are the reason for the occurrence of the behavioural signs.

- The exposure to outdoor climate (-draft).
- The presence and availability of resources which help to maintain a cat's body temperature.
- The presence of behavioural signs of hypothermia/hyperthermia (listed in Tables 13 and 14).

HOW TO RECORD

The authors of this document propose to make recordings based in such manner:

<u>STEP 1:</u> Gather the information about the environmental temperature from the **shelter manager.** Additionally enter the pen or group-housed environment, stand at least 2 meters in front of the pen and visually observe an individual animal and check for parameters listed using the score sheet in ANNEX 13.

<u>STEP 2:</u> After taking these recordings, check for any presence of hypo or hyperthermic behaviours and accordingly check »Yes« or »No«, whether the signs are present or not. Additionally describe those signs. Heart and respiratory rate can be measured in such manner:

<u>HEART RATE:</u> The best pulse point is located on the femoral artery, which is located on the inside of cat's thigh near the groin area. Use your fingers and put some pressure on the middle part of the leg to feel the pulse. Press down and count for 15 seconds and multiple by 4 to get the total number of heart beats per minute. If this position is uncomfortable for the cat or the assessor to perform, this can also be assessed by placing hands behind cat's elbow, over the rib cage.

<u>RESPIRATORY RATE</u>: One inhalation and exhalation represent one breath. This can be easily assessed by observing movement of the cat's rib cage (movement of the cat's sides in and out) and counting the number of breaths a cat takes in one minute. This can also be assessed by placing hands on cat's sides in order to feel the movement. One breath is equivalent to one inhalation and one exhalation. This assessment should be done when the cat is relaxed, but standing. Count each chest rise for 15 seconds and then multiply the results by 4 to calculate breaths per minute.

Table 13: *Descriptions of hypothermic behaviours for the behavioural assessment*

HYPOTHERMIC BEHAVIOURS	DESCRIPTION
DIFFICULTY BREATHING	Shortness of breath - known medically as dyspnea is often described as an intense tightening in the chest, air hunger, difficulty breathing, breathlessness or a feeling of suffocation. It is clearly audible that the cat is having

	difficulties inhaling and exhaling. Usually, their breathing is slow and shallow. However, shortness of breath is not always associated with hyperthermia, because it can be a consequence of other feline respiratory disorders. Therefore, cats diagnosed with respiratory disorders, should be excluded from this assessment.
GENERAL WEAKNESS	Change in cats normal activities (- lower food/water intake, less playful, restlessness, hiding or withdrawing and might become withdrawn.
SHIVERING	A clear trembling of the body.
LOSS OF CONSCIOUSNESS	Cat is suddenly weak, it might vocalise (crying for help), it's legs might be rigid, the forelimbs may briefly become rigid and the head may be pulled back, possible presence of incontinence.
RIGID, STIFF MUSCLES	Cat is having difficulty getting up and down and is walking slowly.
LOW HEART RATE	Cat's heart beats slower than 120 beats per minute.
LOW RESPIRATORY RATE	A cat that is healthy and awake has a respiratory rate of cca 15-60 breaths per minute. When the cat is sleeping it should not take more than 30 breaths per minute. Respiration rate falls outside of the normal range (-20-30 breaths in 60 seconds).
LETHARGY	Lethargy is defined by a deficiency in mental or physical alertness or activity, and refers to drowsiness, sluggishness, dullness or inactivity. Cat is not responding to environmental surroundings and has low energy levels.
DILATED PUPILS	Pupils are clearly expanded and larger than the normal size (elliptical).

HUDDLING (if grouped together)	Cats are lying next to each other/staying in close proximity/lying on top of each other.

Table 14: *Descriptions of hyperthermic behaviours for the behavioural assessment*

HYPERTHERMIA	DESCRIPTION
PANTING	Panting is a method of cooling. Like other forms of evaporative cooling (*e.g.* perspiration), panting expends large amounts of water, which must be replaced if the animal is to maintain effective heat regulation.
RESTLESS BEHAVIOUR	Restless can be defined as the inability to relax or settle, uneasiness, agitation. If the cat is hyperthermic, this behaviour reflects that it is trying to find a cold spot.
SWEATY FEET	Cats sweat through their paws. If hyperthermia is present, they will sweat excessively through that area.
DROOLING	Drooling or excessive salivation, known as ptyalism or sialorrhea can be defined as salivary incontinence or the involuntary spillage of saliva over the lower lip.
EXCESSIVE GROOMING	Cat grooms itself excessively, out of its normal range, so that it has an impact on normal daily activities
REDNESS OF THE TONGUE AND MOUTH	The inner mouth and tongue are both coloured red instead of light pink.
LETHARGY	Lethargy is defined by a deficiency in mental or physical alertness or activity, and refers to drowsiness, sluggishness, dullness or inactivity. Cat is not responding to environmental surroundings and has low energy levels.
VOMITING	Represents an active expulsion of ingesta from the stomach and sometimes duodenum through the mouth.

Diarrhea represents the impaired health state in which the individual's digestive system is not able to digest food properly and form stool properly, as it contains too much water. There are many different reasons (physical, psychological, autogenous) why an individual is experiencing diarrhea, however stressful conditions can also be reflected through the development of the diarrhea.

Based on the theoretical and practical knowledge of the authors of this document, there are **3 categories** of stool consistency:

- **Firm**
- **Soft** (usually result of disease or stress)
- **Liquid** (it can contain admixtures of mucus and blood)

Since it is very hard to address the diarrhea to a specific individual in group housings, this measure will be performed on **the individual level**. However it can be assessed on the group level (if such accommodation is present) as well, with additional adjustments. Even if there is only one case of an (unknown) cat with diarrhea in group accommodation, this is included in the assessment.
Based on this, the proportion of cats with diarrhea in the shelter can be calculated.

WHAT TO RECORD

- Presence and category of diarrhea.
- Other health problems.
- Number and proportion (%) of cats with diarrhea.

HOW TO RECORD:

The authors of this document propose to make recordings based in such manner:

This is assessed **by observation**. Calmly approach the front of the pen or the group housed environment and search for any signs or presence of the visible liquid manure within the cat litter. When recording, use the questionnaire (ANNEX 14). Write down the number of cats with diarrhea.

SCORING INDICATIONS:

Number of cats with presence of diarrhea on the total assessed in the shelter (%)

A normal body weight is of high importance for each cat, so that it can properly function and interact within the environment in which it is housed. Therefore, animals have to be properly fed to maintain their optimal weight, stay healthy and fit. Three main terms describe each category of an individual weight, such as *Underweight*, *Optimal*, *Overweight* and *Very overweight*.

An animal can be overweight but still have significant muscle loss. This can make a muscle condition score of mild to moderate look relatively normal if not carefully evaluated. In contrast, animals can be thin but have normal muscle mass. That's why it's important to assess **both** body condition score and muscle condition score.

There are three ways of measuring individual body condition:

1. **FELINE BODY MASS INDEX (FBMI)**: is an objective way of measuring the optimal weight of animals, by assessing their fat proportions, by calculating their **body mass index** in combination with morphometric measurements.

2. **BODY CONDITION SCORE (BCS)**: evaluates body fat of an animal and is based on visualisation and palpation. However, it is focused more on subjective opinions and results, using pictures and silhouettes of each weight category.

3. **MUSCLE CONDITION SCORE (MCS):** evaluates muscle mass of an animal by performing visual and palpative examination.

FELINE BODY MASS INDEX

FBMI is a practical diagnostic tool for obesity in cats. This objective assessment is based on morphometric measurements of fat proportion of an individual. The proportion of the fat on their body (chest area, abdomen and waist) is measured with taking actual measures of specific body areas and calculating these to gather the overall information about the individual body mass index. Depending on the calculated results, these are afterwards sorted into **four** different categories, mentioned above.

The authors of this document propose to conduct this assessment in combination with the weight of the cat, health status or anamnesis, feeding regime, age and **only** on cats that have been in the adoption area, housed **individually**.

The person conducting FBMI is recommended to be always **the same**, to increase the reliability of the results.
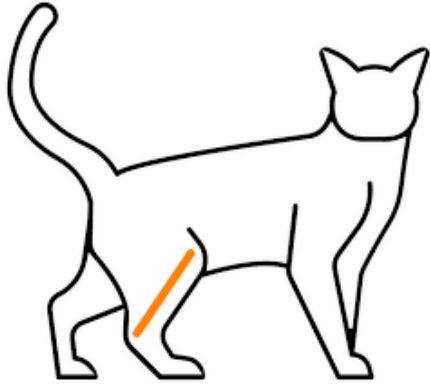
Figure 2: Length of the lower back leg
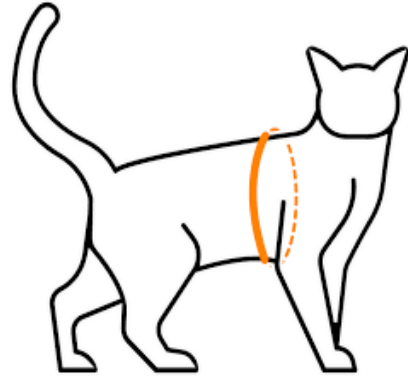
Figure 3: Rib cage circumference

- Weight of the cat using a scale.
- Length of different body parts using **measuring tape** (rib cage circumference, length of the lower back leg from the knee to the ankle).
- Information about the categories of the FBMI (Feline Body Mass Index).

HOW TO RECORD

The authors of this document propose to make recordings in such manner:

STEP 1: Weight the cat and take morphometric body measurements, using the measuring tape as it is shown on pictures (ANNEX 17).

STEP 2: Use the resources to determine FBMI, such as graphs, images and calculator, which can all be found online.

STEP 4: Use the table of weight categories (Table 15) to make the proper categorisation.

STEP 5: Combine these measurements with the health anamnesis, age and feeding regime of the selected cat.

To calculate the feline body mass index, the authors of this document propose to use the following two online versions:

- https://www.omnicalculator.com/biology/cat-bmi
- https://tractive.com/bmi/cat

Table 15: Information on recordings for Feline *Body Mass Index (FBMI).*

WHAT TO RECORD	DESCRIPTION/FBMI
CATEGORY	
UNDERWEIGHT/TOO THIN	> 15 %
OPTIMAL/ADEQUATE	16–25 %
OVERWEIGHT	> 30 % (26–55)
OBESE/VERY OVERWEIGHT	> 55 % (56–65)

BODY CONDITION SCORE

BCS is a very practical tool, based on visual and tactile assessment of an individual's body condition, which can be performed in the home environment as well. By feeling the cat's waistline, ribs and stomach, along with viewing the cat from above, it helps to assess fat storages and determines if cats are in an ideal body condition. If the cat is longhaired, feeling its waistline is highly important, as it can be easy to assume they are under, or overweight.

Areas assessed in BCS include:

- CHEST
- HIPS
- ABDOMEN
- WAIST

The authors of this document propose to conduct this assessment in combination with the weight of the cat, health status or anamnesis, feeding regime and **only** on cats that have been in the adoption area, housed **individually**.

The person conducting BCS is recommended to be always **the same**, to increase the reliability of the results.

WHAT TO RECORD

- Proportion of body fat and body condition using a visual and tactile approach with the help of the table categorisation (Table 16).

HOW TO RECORD

The authors of this document propose to make recordings in such manner:

STEP 1: Enter the room and remain calm near the entrance for the first minute. Approach to the selected pen, slowly and calmly open the pen and present your hand (stop if the cat is obviously withdrawing).

STEP 2: Wait for the cat to approach and see if she wants to interact or not (Cat approach test).

STEP 3: Start with the tactile approach and use your hand to gently touch body parts (chest, hips, abdomen and waist) included in the body condition scoring and make notes. Continue with the visual approach and observe the cat from the above and from both sides. Use Table 1 to make scores.

STEP 4: Combine these measurements with the health anamnesis (gastrointestinal problems, weight …), age, feeding regime, and write scores in the score sheet ANNEX 15.

Before the assessment it is recommended read the manual and to watch the video instructions, for example

- https://wsava.org/wp-content/uploads/2020/08/Body-Condition-Score-cat-updated-August-2020.pdf
- https://www.youtube.com/watch?v=tf_-rwxqHYU

Table 16: Information on recordings for *Body Condition Score (BCS). Adapted by WSAVA Global Commission Committee (2013).*

WHAT TO RECORD	
FAT PROPORTIONS	DESCRIPTION/BCS
UNDERWEIGHT/TOO THIN 1. Ribs are very easily seen on short-haired cats. No palpable fat. Severe abdominal tuck. Lumbar vertebrae and wings of ilia easily palpated. 2. Ribs easily visible on short haired cats. Lumbar vertebrae are obvious. Pronounced abdominal tuck. No palpable fat.	
3. Ribs are easily palpable with minimal fat covering. Lumbar vertebrae are obvious. Obvious waist behind ribs. Minimal abdominal fat. 4. Ribs palpable with minimal fat covering. Noticeable waist behind ribs. Slight abdominal tuck. Abdominal fat pad absent.	
OPTIMAL/IDEAL 5. Well-proportioned. Observe waist behind ribs. Ribs palpable with slight fat covering. Abdominal fat pad minimal.	

OVERWEIGHT

6. Ribs palpable with slight excess fat covering. Waist and abdominal fat pad distinguishable but not obvious. Abdominal tuck absent.
7. Ribs not easily palpated with moderate fat covering. Waist poorly discernible. Obvious rounding of abdomen. Moderate abdominal fat pad.

OBESE/VERY OVERWEIGHT

8. Ribs not palpable with excess fat covering. Waist absent. Obvious rounding of abdomen with prominent abdominal fat pad. Fat deposits present over the lumbar area.
9. Ribs not palpable under heavy fat cover. Heavy fat deposits over the lumbar area, face and limbs. Distention of abdomen with no waist. Extensive abdominal fat deposits.

MUSCLE CONDITION SCORE

MCS evaluates muscle mass, and is based on **a visual and tactile approach**. It is determined by feeling the cat's muscles over her back, head, shoulders, and hips, over »bony areas«.

It helps to evaluate whether the cat has lost or gained muscle mass, which is essential for normal functioning of the body. Muscle loss is common in animals as they age, (sarcopenia) or are sick or injured (cachexia) and it makes an animal weaker, depresses immune function and reduces the ability to recover from illness, surgery or injury.

Although some of the areas of the body may appear relatively normal or even to have excessive fat stores (especially over the ribs or in the abdominal region), muscle wasting is readily felt over bony prominences. Typically, muscle loss is firstly noted in the epaxial muscles on each side of the spine.

The authors of this document suggest to include the following areas of the assessment:

- **BACK** (over the temporal bones; Longissimus dorsi muscle and Iliocostalis muscle)
- **HEAD** (Scapulae; Temporalis muscle)
- **SHOULDERS** (over Lumbar vertebrae; Trapezoid muscle and superficial deltoid muscle)
- **HIPS** (over pelvic bones; Biceps femoris muscle)

The authors of this document propose to conduct this assessment in combination with the weight of the cat, health status or anamnesis, age and feeding regime and **only** on cats that have been in the adoption area, housed **individually**.

However, the person conducting MCS is recommended to be always **the same**, to increase the reliability of the results.

Muscle loss using a visual and tactile approach with the help of the categorisation (Table 17) below.

Table 17: Information on recordings for *Muscle Condition Score (MCS). Adapted by WSAVA Global Commission Committee (2013).*

WHAT TO RECORD	DESCRIPTION/MCS
MUSCLE MASS LOSS	
	Normal muscle mass. No muscle wasting.
	Mild muscle wasting
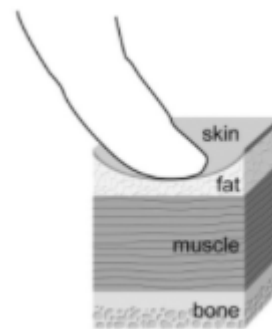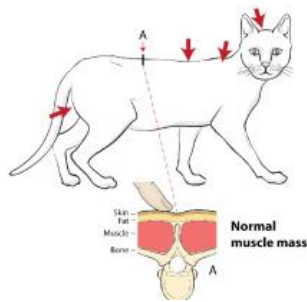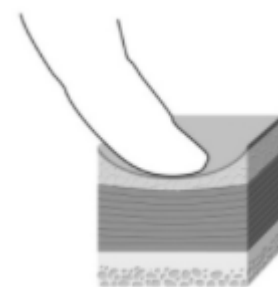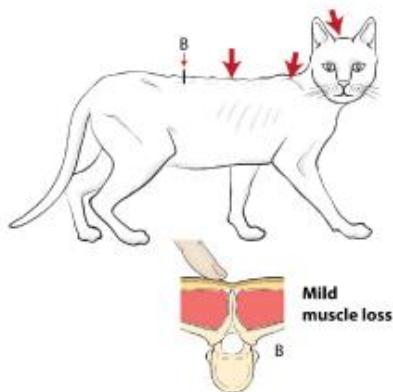
Moderate muscle wasting
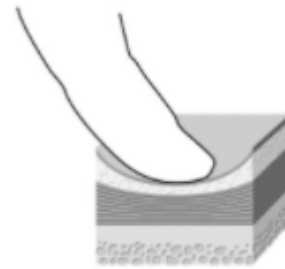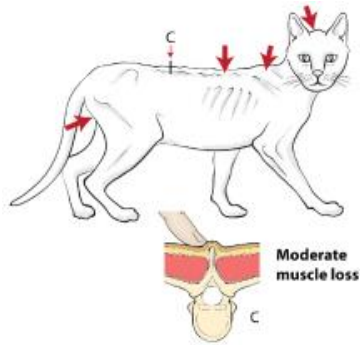
Severe muscle wasting
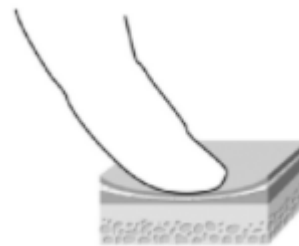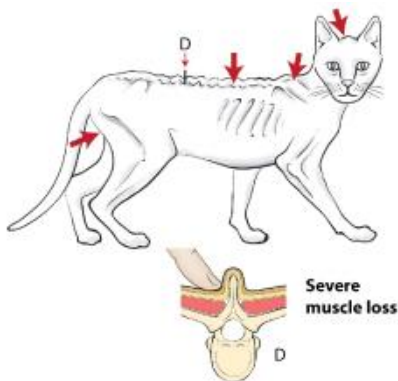
HOW TO RECORD

The authors of this document propose to make recordings in such manner:

STEP 1: Enter the room and remain calm near the entrance for the first minute. Approach to the selected pen, slowly and calmly open the pen and present your hand (stop if the cat is obviously withdrawing).

STEP 2: Wait for the cat to approach and see if she wants to interact or not (Cat Approach Test).

STEP 3: Star with the tactile approach and use your hand to gently touch and palpate bony parts (over back, head, shoulders and hips) included in Table 14. Start with the opaxial muscles (over the back). Continue with the visual approach and observe the cat from the above and from both sides.

STEP 4: Combine these measurements with the health anamnesis (gastrointestinal problems, weight …), age, feeding regime, body condition score and write scores in the score sheet ANNEX 18.

Before the assessment it is recommended to read the manual and to watch the video instructions, for example

- https://www.youtube.com/watch?v=fzEruEe-WRs
- https://wsava.org/wp-content/uploads/2020//Muscle-Condition-Score-Chart-for-Cats.pdf

SKIN CONDITION

The skin is another valid health indicator, as it can greatly affect the mental as well as physical condition of the animal. Skin abnormalities (swellings, irritations), lesions (open wounds) or even hair loss indicate poor welfare conditions and can also reflect the environmental conditions of housed cats. Another factor that is detrimental to their health, as well as poor skin condition, are ectoparasites, which act as vectors for transferable (transmissible) diseases.

Table 18: Information recorded by assessors under skin condition assessment

WHAT TO RECORD	DESCRIPTIONS
SWELLING	Swelling is an abnormal enlargement of a body part or an area, typically as a result of an accumulation of fluid.
OPEN WOUNDS	Open wounds represent injuries involving external or internal body tissue rupturing. Usually the skin is either cut, torn or punctured. Scoring involves bleeding areas or larger than 2 cm wounds.
HAIR LOSS	Represents areas on the body without any hair.
ECTOPARASITES	Represent a group of microorganisms which live on the surface of the skin of their host. The most common feline ectoparasites are fleas, ticks and lice. The faeces of adult fleas look similar as black pepper flakes and turns red under water.

HOW TO RECORD

The authors of this document propose to make recordings in such manner:

This is assessed **by observation**. Approach the individual cat in a standing position and view it from both sides and front and search for any evidence of swollen areas, open wounds, hair loss or ectoparasites. If the cat does not show any present skin abnormalities or issues, the scoring sheet can be left blank. When recording use the scoring sheet ANNEX 16.

COAT CONDITION

Coat can serve as a great health indicator, reflecting not only an individual's diet chronic illness, cleanliness of the floor and their bedding, but also the quality of social interactions. Glossy, parasite-free coat reflects good health. If wounds, scars or lesions are present, it can inform us about increase in aggressive interactions, improper care and environmental conditions.

It can also lead to a change in the grooming behaviour of an individual. It should be clean, dry, free of faeces or urine. By definition, cleanliness represents a degree of dirt on the body (splashing). Hair of the coat is standing up, separated and dull, instead of lying flat and being smooth and shiny.

WHAT TO RECORD:

- Presence of dirt on the coat (urine/faeces) of each individual cat. (urine/faeces).
- Presence of any wet areas on the coat of each individual cat.
- Presence of shaggy or matted coat.
- Presence of 1 bald spot (of at least 1 x 1 cm) or multiple bald spots/alopecia.
- Evidence of excessive grooming.

HOW TO RECORD:

The authors of this document propose to make recordings in such manner: Approach the individual cat in a standing position and view it from both sides and front and search for any parts of the coat that might be dirty, wet or without hair. Assess the coat condition by observation using the scoring sheet ANNEX 19.

SCORING INDICATIONS:

Proportion of cats in the shelter showing dirty or wet areas (%).

Number of animals with poor coat condition.

EYE AND NASAL DISCHARGE

Upper respiratory tract diseases are most commonly seen in animal shelters because the animals are exposed to a great deal of stress during the first few days or weeks. As a consequence, cats experience a decline in the functionality of their immune system, resulting mainly in upper respiratory diseases, which are in most cases reflected through eye and nasal discharge. These signs may appear after only one week of stay in the shelter.

Table 19: *Different types of eye and nasal discharge*

DISCHARGE	DESCRIPTION
EYE DISCHARGE	*Represents excess fluid in the eyes. It can be watery and clear or thick and opaque (due to infections). It can be detected as obvious **crusts** or **serous/mucous/purulent** in the eyes.*
NOSE DISCHARGE	*Represents excess thin nasal mucus fluid, which is a slippery fluid produced by the membranes lining in the nose. It can be detected as obvious **crusts** or **serous/mucous/**purulent from the nose.*

Discharge represents the excess fluid or mucous (thick layer) from the eyes and the nose, which can occur for a variety of reasons. There are four main types of discharge:

- **SEROUS:** clear, watery and transparent (due to a viral infection)
- **MUCOID:** cloudy, yellow and mucous-like (due to bacterial infection)
- **PURULENT:** green, yellow and thick (due to bacterial infection)
- **SANGUINEOUS:** bloody and it might look like red-coloured sleep crust, wet and wrinkled (due to injury of the eye or the mucous)

Sometimes nasal discharge can have a foul odour, which can be specific to certain types of bacterial infections, tissue damage, or sinus infections secondary to tooth root infections.

The authors of this document suggest, based on their theoretical and practical knowledge that if the discharge is purulent (the severe form of the »glued eyes«), this could be interpreted as lack of inadequate care or complete absence of animal care, by the shelter caretakers.

WHAT TO RECORD

- The presence of eye or nose discharge.
- The presence of adequate care (treated or untreated).
- Frequency of the care (how many times per day).

HOW TO RECORD:	SCORING INDICATORS:
The authors of this document propose to make recordings in such manner: This is assessed by observation. Calmly approach the front of the pen and visually observe and check for any presence of signs of the discharge. When recording, use the scoring sheet ANNEX 20.	Number of animals with eye or nasal discharge.

EAR DISCHARGE

Felines do not develop only eye or nose discharge but ear discharge as well.

Ear discharge represents a thick mucus layer or a waxy substance that prevents particles from entering the inner portions of the ears. It can occur for a variety of reasons. The most common reasons are ear mites, ear infections (yeast or bacterial infections), immune-related conditions, drug reactions and allergies. Healthy ears are usually pink, have clean inner cannal, without any smell and contain little or no wax. Discharge is usually light browned.

Sings of ear discharge can be listed as:

- **Black or dark brown discharge** (ear mites; can be seen under a microscope)
- **Irregularly pigmented or orange coloured discharge**
- **Cream coloured discharge**
- **Foul smell** (due to yeast infection)

The most common behaviours due to ear discharge are:

- Pawing at the ears
- Scratching of the ears
- Shaking of the ears
- Head tilting or head shaking
- Irritability and sensitivity to touch
- Vocalisations
- Rubbing the ear against the object or the floor
- Hiding

WHAT TO RECORD

- The presence of ear discharge and signs of ear discharge.
- The presence of accompanied behaviours.
- The presence of adequate care (treated or untreated).
- Frequency of the care (how many times per day).

HOW TO RECORD

This is assessed by observation. Calmly approach the front of the pen and visually observe and check for any presence of signs of the discharge. Combine the measurements with the health anamnesis and health records. When recording, use the scoring sheet ANNEX 20

SCORING INDICATIONS:
Number of animals with ear discharge.

OTHER RESPIRATORY DISORDERS

Cats are often prone to developing respiratory diseases. Chronic coughing and sneezing can both reflect poor welfare of animals, as they are usually a consequence and a symptom of a respiratory disease. The assessor should observe cats for more than 2 minutes in order to detect the presence of coughing or sneezing.

Table 20: *Description of respiratory disorders for the assessment*

WHAT TO RECORD	DESCRIPTION
COUGHING	Cough is an important physiological function to preserve the normal health of the respiratory tract, which operates by rapidly expelling harmful substances such as foreign bodies, excessive mucus, or debris from the upper airways.
SNEEZING	Sneezing is an involuntary protective reflex that expels air from the lungs through the nose in a sudden explosive manner, to clear the upper airways and mouth. It is triggered when chemical or physical irritants stimulate the subepithelial receptors in the nose.

HOW TO RECORD:	SCORING INDICATIONS:
The authors of this document propose to make recordings in such manner: Assessor should visually observe each individual animal, standing 2 meters in front of the pen using score sheet ANNEX 21. Observe and search for any evidence of cats coughing and sneezing.	Proportion of coughing animals on the total assessed in the shelter (%).

SICKNESS BEHAVIOURS

Sickness behaviours represent a set of behaviours which indicate that an individual cat is sick. Therefore, these behaviours can be included in the assessment as they are appropriate indicators of deteriorated welfare. The most common sickness behaviours are:
- Vomiting,
- Diarrhea Refusal of food,
- Lethargy,
- Fever,
- Drowsiness,
- General decrease in activity.

Table 21: *Description of sickness behaviours used in the assessment*

SICKNESS BEHAVIOURS	DESCRIPTION
VOMITING	Represents an active expulsion of ingesta from the stomach and sometimes duodenum through the mouth.
DIARRHEA	Diarrhea is caused by excess faecal water resulting from decreased intestinal absorption and or increased intestinal secretion.
REFUSAL OF FOOD	An animal rejects and does not ingest the food.
LETHARGY	Lethargy is defined by a deficiency in mental or physical alertness or activity, and refers to drowsiness, sluggishness, dullness or inactivity.
FEVER	Fever is defined as an increased body temperature associated with a raised (And often more variable) thermoregulatory set point in the anterior hypothalamus that is secondary to the release of pyrogens or fever-inducing substances.
GENERAL DECREASE IN ACTIVITY	Cat is not engaging in the normal daily activities as per usual.

HOW TO RECORD:

The authors of this document propose to make recordings in such manner: This is assessed in the quarantine area. Assessor should visually observe each individual animal, standing 2 meters in front of the pen using score sheet ANNEX 22. Observe and search for any evidence of sickness behaviour signs.

SCORING INDICATIONS:

Number of animals showing evidence of sickness behaviours listed in the table.

PAIN ASSESSMENT

Pain is a subjective emotion, which can be experienced even in the absence of obvious external noxious stimulation, and which can be enhanced or abolished by a wide range of behavioural experiences including fear and memory. Although when evaluating pain is cats is that cats usually tend to hide and this makes it harder to assess the clinical sings of the disease. However, the absence of indicators does not necessarily mean that the animal is healthy.

Therefore, WSAVA proposes, as well as the authors of this protocol to measure pain through behavioural observations. The authors of the protocol developed this observational measure, where the focus is on different aspects of pain expression, as not all animals express pain in the same way. Pain can be expressed through:

- **Behavioural responses** (observations of body language)
- **Vocalisations** (the higher the voice and frequency, in more pain an individual is)
- **Facial expressions** (Feline Grimace Scale)
- **Change in general activities** (feeding, drinking, sleeping, less interactions).

BEHAVIOURAL OBSERVATIONS

Although cats sometimes do not show obvious signs when in pain, certain behavioural responses are common if they are suffering from an injury and are in pain. These responses can also be directed towards the site of an injury. Therefore, observational assessment of those behaviours can be made in combination of gathering information about their health status and receiving analgesics. The assessment can be performed on the individual, as well as group housed cats.

WHAT TO RECORD:	HOW TO RECORD
Behavioural changes and responses, such as:	The authors of this document propose to make recordings in such manner:

Behavioural changes and responses, such as:

- Increased grooming (touching, smelling, licking) in specific area
- Avoidance of handling and decreased tolerance for physical contact
- Vocalisation (frequent plaintive or urgent sounding miaow, groaning, hissing, growling)
- Lameness and regional sensitivity
- Reduction in movement and activity
- Increased hiding
- Decreased interest in positive stimuli (play, social interaction)
- Changes in body posture and their lying positions (crouching, lowering of the head, squinting or closing the eyes, flattening of the ears, compression of the muzzle area)

The authors of this document propose to make recordings in such manner:

Assessor should visually observe each individual animal, standing 2 meters in front of the pen using score sheet ANNEX 23. Observe and search for any evidence of behavioural responses, which reflect that the cat is in pain. Combine this information with the health anamnesis and information about analgesics treatment.

Pain assessment should be performed as often as needed and, on a case, -by-case basis as the authors of this document propose. Behavioural observations (if possible) should be performed with the additional gathering of information, whether:

- The cats have received analgesics upon the admission to the shelter.

- The cats have received analgesics after they have been neutered/spayed.
- Time of supply: Time at which the cats have received the analgesics.

FELINE PAIN GRIMACE SCALE

The Feline Grimace Scale (FGS)) is a valid, fast, reliable and easy-to-use tool that can help with pain assessment. Based on the scores of the Feline Grimace Scale, it is possible to know if the administration of analgesics (i.e. painkillers) is required helping veterinarians with clinical decisions in pain management. It is used for acute pain assessment in cats with medical, surgical or oral pain etc.

It was developed to detect and measure any presence of pain in cats. There are five action units (AU), which are scored on the scale from 0 to 2. The final score is calculated by the sum of scores divided by the maximum possible scores. Five actions units are:

1. Ear position
2. Orbital tightening
3. Muzzle tension
4. Whisker's position
5. Head position.

Table 22: The action units of *feline pain grimace scale used within the assessment. Adapted by Evangelista et al. (2019).*

WHAT TO RECORD	DESCRIPTION	
ACTION UNIT IS ABSENT (0)	Ears are facing forward, eyes are opened. Muzzle is relaxed (round shape). Whiskers are loose and curved and the head is above the shoulder line.	
ACTION UNIT IS MODERATELY PRESENT (1)	Ears are slightly pulled apart. Eyes are partially opened. Muzzle is mildly tense and the whiskers slightly curved or straight. Head is aligned with the shoulder line.	
ACTION UNIT IS MARKEDLY PRESENT (2)	Ears are flattened and rotated outwards; eyes are squinted eyes. Muzzle is tense (elliptical shape) and the whiskers straight and moving forward. Head is below the shoulder line or tilted down (chin towards the chest).	

The authors of this document propose that the assessors should be trained and familiar with the conditions and guidelines of the Feline Grimace Scale tool.

Therefore, it is recommended to read the online practical printable manual and guidelines before the assessment takes place.

Before the assessment It is recommended read the online manual, for example:

- **Official webpage**: https://www.felinegrimacescale.com/
- **Printable layout:** https://590cd237-31a0-4ba7-9627-a0273eb3a853.filesusr.com/ugd/103d43_1ea5f0fa07cc45c09f9e1091526c81fa.pdf
- **Printable training manual**: https://static-content.springer.com/esm/art%3A10.1038%2Fs41598-019-55693-8/MediaObjects/41598_2019_55693_MOESM1_ESM.pdf

The following guidelines are based on the original guidelines for FGS, available online:

STEP 1: If the information about performance of the analgesics and at which time they were given to the cats upon the admission to the shelter cannot be obtained, perform the FGS using score sheet ANNEX 24.

STEP 2: Observe the cat undisturbed for 30 seconds and then score. If the cat is grooming, eating or vocalising, wait until these activities are finished before scoring. If a cat is sleeping, leave it undisturbed and wait until it is awake. Each action unit is individually evaluated and scored as '0' (action unit is absent), '1' (action unit is moderately present or there is uncertainty over its presence) or '2' (action unit is obviously present). See examples of each action unit scored as '0', '1' or '2' in the table above.

Combine the observations with the health anamnesis and treatment (receivement of the analgesics and daily monitoring).

Analgesic treatment is suggested when the final score is ≥ 4/10 or 0.4/1.0

In this last section of the protocol, assessors can find detailed instructions on how to conduct the assessment. Each assessor should prepare beforehand and go through the detailed instructions below, on how and when to carry out the assessment. Below, one can find all practical forms for the assessment, which should be printed for use.

STEP BY STEP ORDER TO CARRY OUT THE PROTOCOL

CONTACT THE SHELTER MANAGER

Contact the manager of the shelter to explain the aim of your visit and to make an appointment. Ask about the number of animals hosted at the time, as this will allow you to estimate the number of animals you will have to assess and prepare a sufficient number of record forms. In addition, ask for his/ her availability to retrieve some data from the shelter records (e.g. mortality, morbidity, total expenses for medical treatments …), you can send an email with the information required, saving time at the moment of the visit.

ASSESSMENT IN THE SHELTER:

1. Once at the shelter, take the Management questionnaire (Annex 1 and 2) and start filling the General information section. If the manager (or other competent person) is available, compile the remaining sections of Annex 1. Ask for a copy of the map of the facility; if it is not available, draw the map yourself, either copying an existing map, or giving a quick tour of the facility and sketching the location and modules of pens you see.

2. Take a few minutes to define the number of pens and their random location around the shelter), and how many animals within each pen you need to assess. Get everything ready for the assessment (clip-board, pen, stop watch, scoring sheets in the correct order) and record the starting time (upper part of each Annex).

3. Place yourself in front (2 meters from the fence) of the first selected pen and visually choose the subjects of that pen to be assessed later at individual level. Then, start recording the information of the Resource checklist (Annex 3, 4, 5, 6). Parameters that can not be scored from outside (e.g. space allowance) can be scored later on by entering the pen.

4. Without changing position, take the Behavioural observation form (Annex 7–24) and observe all the animals in that pen for the amount of time which the observational method requires and make scores.

5. Now start observing the chosen cats, one at the time. Per each cat, compile information included in the Individual assessment form (Annex 12–24). Each assessment method contains a detailed explanation on how to perform the assessment.

6. Once all previous steps are completed (estimated time between 5 and 9 minutes/pen), score the presence or absence of animals showing abnormal behaviour (according to definitions in section 4.8). If necessary (to score resource base measures or if the number of animals in the pen is over 5 dogs), the assessor may enter the pen to finish the assessment.

7. Move to the second selected pen and start again from point 4.

8. Once all the sample pens have been assessed, record the end of assessment time (bottom of Annex 1).

MEASUREMENTS AT THE SHELTER LEVEL

ANNEX 1: GENERAL INFORMATION

DATE:	ASSESSOR:
COUNTRY:	REGION/TOWN:
START (assessment):	END (assessment):

GENERAL INFORMATION	
Day of the assessment	
Name of the assessor	
The identification of the shelter	
Number of cats in the shelter on the day of the visit	
Number of hospitalised cats on the day of the visit	
Temperature in the quarantine and isolation area (° C)	

Presence of animal checklist for monitoring (adoption/quarantine area)	
Which relevant information is provided on each animal checklist (microchip code, cat characteristics and health status and other specific information ...)?	
The total number of caretakers in the shelter	
Qualification of caretakers (professionals or volunteers)	
Number of cats per caretaker (the number of cats that the caretakers has to take care in a given time)	
Shelter response time (in hours)	
SOCIAL ACCOMMODATION (%)	
Total number of pens (%)	
Number of single/individual pens (%)	
Number of outdoor areas (%)	
Number of isolation pens (quarantine) (%)	
Number of hospital pens (%)	

Number of group-housed environments (%)	
Total size of individual pens	
Total size of group housed environments	
Maximum group size	
Separate accommodation for injured, ill or pregnant and lactating cats	

Separate accommodation of dogs and cats and the presence of the sound barrier	• Yes • No	• Yes • No

HEALTH: SURGERIES AND CONTROL OF PAIN

Presence of operating procedures for post-surgical monitoring (health therapy, daily monitoring, analgesics …)	▪ Yes ▪ No	
Presence of protocols of analgesia	▪ Yes ▪ No	
Goods that help to reduce and relieve pain after surgery (boxes, curtains, closed beds, thermophore …)	▪ Yes ▪ No	Which:

MORTALITY

The number of euthanasia because of health problems during the last 12 months	

The number of euthanasia because of behaviour problems during the last 12 months	
The number of deaths (other than euthanasia) during the last 12 months	
Cat shelter population (mean number of animals in the last 12 months)	
MORBIDITY	
Total expenses for medical treatment in the last 12 months	

The authors of this document propose to make recordings in such manner:

Ask the shelter manager to provide the required records which contain the general information, about the correct number and size of group housed environments and individual pens, information about health, mortality and morbidity. Certain points of the general information such as the temperature, presence of animal checklist and social accommodation can be additionally assessed **by observation** as well. The assessor should select an observational point that allows a good view in each room /section of the shelter in order to properly count the number of available areas, using a score sheet.

NOTES

DATE:		ASSESSOR:
SHELTER:		REGION/TOWN:
START (assessment):		END (assessment):
WHAT TO RECORD		**SCORING**
Type of diet		• Dry pellets • Cooked food • Wet food • Raw food • Mixed (mixture of different brands of kibble)
Special diets for different age groups		• Kittens • Old animals • Hospitalised animals • No special diets
Feeding regime		• Once per day • Twice per day • Ad libitum
Person feeding the cats		• Staff only • Volunteers
Food storage		• Wet food • Dry food • Fridge • Box • Outside/open • Outside/open

HOW TO RECORD

The authors of this document propose to make recordings in such manner:

Ask the shelter manager to provide the required records which contain the information about feeding of the animals. The assessor should also collect information on the dietary schedule of the shelter staff. When recording, use the scoring sheet. Make additional notes, if necessary.

NOTES

MEASUREMENTS AT THE PEN LEVEL

ANNEX 3: SPACE ALLOWANCE							

DATE:	ASSESSOR:						
SHELTER:	REGION/TOWN:						
START (assessment):	END (assessment):						
CAT/PEN ID	DIMENSIONS			PRESENCE (Yes/No)			
	LENGHT	WIDTH	HEIGHT	INDOOR AREA	OUTDOOR AREA	DOORS (outdoor enclosures)	SHARP EDGES

HOW TO RECORD

The authors of this document propose to make recordings in such manner:

Ask the shelter manager to provide the information about the dimensions (width, length, height) of indoor and outdoor areas. It should be checked whether the cats are really limited within their pen regarding their age and size (kittens can normally move and function even in minimally standardised pens). Additionally, it can be assessed **by observation**. Enter the room and select an observational point that allows a good view in each room /section of the shelter. When recording, use the scoring sheet ANNEX 3) in the last section of this protocol.

Make additional notes, if necessary.

NOTES

DATE:	ASSESSOR:								
SHELTER:	REGION/TOWN:								
START (assessment):	END (assessment):								
		PRESENCE & QUANTITY							
CAT/PEN ID	TYPE OF HOUSING (Individual/Group)	RESTING PLACE	HIDING PLACE	LITTER BOX	SUBSTRATE FOR LITTER BOX	DISTANCE (litter box, food, water bowls)	TOYS	SCRATCHING MATERIAL	ELEVATED SURFACE

HOW TO RECORD

The authors of this document propose to make recordings in such manner:

This is assessed **by observation** from inside the group housed environment or in front of the individual pen. Walk around the group housed environment or stand 2 m in front of the pen and visually observe and check for the presence and the quantity of the resources (described and listed in the table below). When recording, use the scoring sheet. Make additional notes, if necessary.

ANNEX 5: FOOD AND WATER SUPPLY

DATE:		ASSESSOR:					
SHELTER:		REGION/TOWN:					
START (assessment):		END (assessment):					
			PRESENCE (Yes/No)				
CAT/PEN ID	TYPE OF HOUSING (Individual/Group)	PRESENCE&NUMBER OF FOOD BOWLS	PRESENCE&NUMBER OF WATER BOWLS	TYPE*	MATERIAL*	DISTANCE BETWEEN THE BOWLS	FRESHNESS

*TYPE: (food bowls): Bowl, interactive feeders or toys, automatic feeders

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*TYPE: (water bowls): Bowl, automatic fountain, glass tumblers

*MATERIAL: Plastic, ceramics, stainless steel, glass

The authors of this document propose to make recordings in such manner:

Water and food supply is assessed **by observation** from inside the pen or group housed environment. Enter the enclosure (pen/group housed environment) and make recordings, using the score sheet. Make additional notes, if necessary.

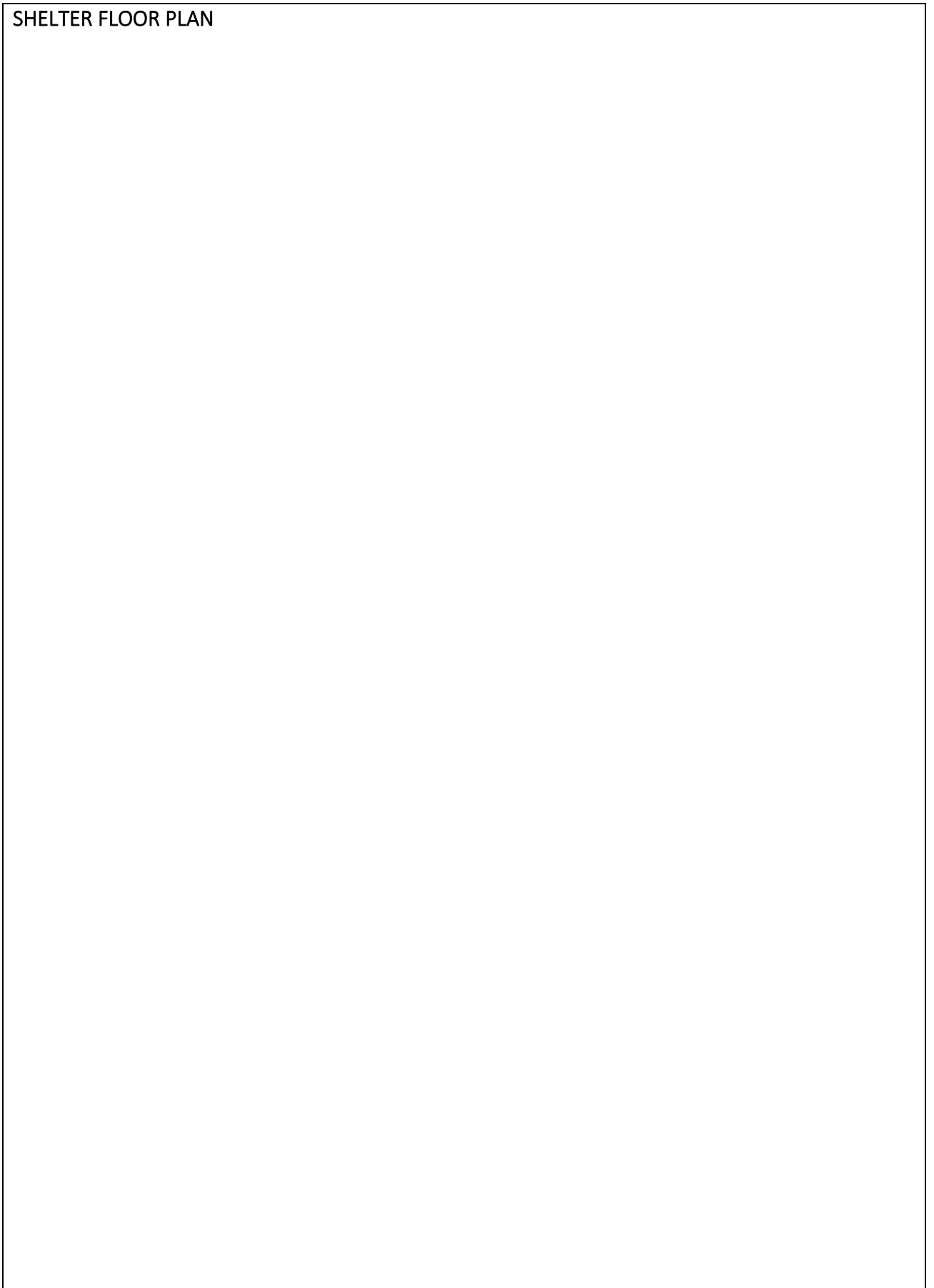| DATE:			ASSESSOR:	
SHELTER:			REGION/TOWN:	
START (assessment):			END (assessment):	
CAT/ PEN ID	TYPE OF HOUSING (Individual/Group)	TEMPERATURE OF THE ENVIRONMENT (°C)	WEATHER IMPACTS (Draft)	ACCESS TO DAYLIGHT (Yes/No)

HOW TO RECORD

The authors of this document propose to make recordings in such manner:

Ask the shelter manager to provide the information about the environmental temperature of each room in the shelter. This can be also assessed by **observation** (access to daylight and temperature, if any thermostats or thermometers are available in the environment.

When recording, use the scoring sheet. Make additional notes, if necessary.

NOTES

ANNEX 7: CAT APPROACH TEST

DATE:			ASSESSOR:		
SHELTER:			REGION/TOWN:		
START (assessment):			END (assessment):		
CAT/PEN ID	TYPE OF HOUSING (Individual/group)	TYPE OF THE PEN MATERIAL (Wire, glass, no barrier)	CONTACT POSSIBLE	NO CONTACT POSSIBLE	OBSERVED BEHAVIOURS

*This makes it easier for the assessor to understand why the second column (type of the pen material) is eft empty.

HOW TO RECORD

STEP 1: Enter the room and remain calm near the entrance for the first minute. Approach the selected cat in the group or to the pen in a slow, smooth motion and present your hand (stop if the cat is obviously withdrawing).

STEP 2: There should be 20 cm distance between the hand and the cat and no direct eye contact.

STEP 3: Wait for the cat to approach, afterwards choose the scoring options using the table above. Make additional notes, if necessary.

Printable manual for the FSA is available online:
https://www.aspcapro.org/sites/default/files/ASPCA-FSA-manual-2016.pdf

Printable assessment sheets available online:

https://www.aspcapro.org/sites/default/files/ASPCA-FSA-assessment-sheets-2016.pdf

Printable checklist available online:

https://www.aspcapro.org/sites/default/files/FSA-3-checklist.pdf

Printable scoring examples available online:

https://www.aspcapro.org/sites/default/files/FSA-5-scoring.pdf

DATE:	ASSESSOR:										
SHELTER:	REGION/TOWN:										
START (assessment):	END (assessment):										
SCORING (1-7)											
CAT PEN/ID	BODY	BELLY	LEGS	TAIL	HEAD	EYES	PUPILS	EARS	WHISKERS	VOCALISATIONS	ACTIVITY

SCORE	BODY	BELLY	LEGS	TAIL	HEAD	EYES	PUPILS	EARS	WHISKERS	VOCALISATION	ACTIVITY
1 Fully relaxed	I: Laid out on side or on back A:NA	I: Exposed, slow ventilation	I: Fully extended A: NA	I: extended or loosely wrapped A:NA	Laid on the surface with chin upwards or on the surface	Closed, or half open, may be slowly blinking	Normal (consider ambient light)	Normal (half back)	Normal (lateral)	None or soft purr	Sleeping or resting
2 Weakly relaxed	Laid ventrally or half on side or sitting	Exposed or not exposed, slow or normal ventilation	I: Bent, hind legs may be laid out A: When standing extended	I: Extended or loosely wrapped A: Tail up or loosely downward	Laid on the surfaces or over the body, some movement	Closed, half opened or fully/normally opened	Normal (consider ambient light)	Normal (halfback) or erect and moved to front	Normal (lateral) or forward	None	Sleeping, resting, alert or active, may be playing
3 Weakly tense	Laid ventrally or sitting A: Standing or moving, back horizontal	Not exposed, normal ventilation	I: Bent A: While standing extended	I: On the body or curved backward, may be twitching A: Up or tensedownward, may	Over the body, some movement	Normally opened	Normal (consider ambient light)	Normal (halfback) or erect and moved to front or back and forward on head	Lateral (normal) or forward with small amount of tension	Meow or quiet	Resting, awake, or actively exploring

				be twitching							
4 Very tense	Laid ventrally, rolled or sitting A: Standing or moving, body behind lower than the front	Not exposed, normal ventilation	I: Bent A: When standing hind legs bent in front extended	I: Close to the body A: Tense downward or curled forward, may be twitching	Over the body or pressed to the body, little to no movement	Widely opened or pressed together	Normal or partially dilated	Erected to front or back, or back and forward on head	Lateral (normal) or forward with tension	Meow, plaintive meow or quiet	Cramped, sleeping, resting or alert, may be actively exploring, trying to escape
5 Fearful and stiff	Laid ventrally, rolled or sitting A: Standing or moving, body behind lower than the front	Not exposed, normal or fast ventilation	I: Bent A: Bent near the surface	I: Close to the body A: Curled forward, close to the body	On the plane of the body, less or no movement	Widely opened	Dilated	Partially flattened	Lateral (normal) or forward and back	Plaintive meow, yowling, growling, or quiet	Alert, may be actively trying to escape

	Body posture	Breathing	Legs	Tail	Belly	Eyes	Pupils	Ears	Head	Vocalization	Activity
6 Very fearful	Laid ventrally or crouched directly on all top of the paws, may be shaking A: whole body near to the ground, crawling, may be shaking	Not exposed, fast ventilation	I: Bent A: Bent near the surface	I: Close to the body A: Curled forward, close to the body	Near to surface, motionless	Fully opened	Fully dilated	Fully flattened	Back	Plaintive meow, yowling, growling, or quiet	Motionless, alert or actively prowling
7 Terrorized	Crouched, directly on top of all fours, shaking A: NA	Not exposed, fast ventilation	I: Bent A: NA	I: Close to the body A: NA	Lower than the body, motionless	Fully opened	Fully dilated	Fully flattened, back on head	Back	Plaintive meow, yowling, growling, hissing, or quiet	Motionless, alert

Adapted by Mccune (1994); from Kessler and Turner (1997). Cat Assessment Score.

A: Active, I: Inactive

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The authors of this document propose to make recordings in such manner:

This is assessed **by observation**. The assessment should be carried out **at least once per day** after feeding and cleaning procedure, **by the same observer.**

Enter the room slowly and calmly, or approach the front of the pen and wait for the cats to habituate to your presence (5-10 minutes). Start observing each cat for approximately 1 minute. When recording, use the 7-point scale Cat Stress Score and make no physical or vocal interactions. Make additional notes if necessary.

NOTES

ANNEX 10: FRUSTRATION SCALE

DATE:	ASSESSOR:		
SHETER:	REGION/TOWN:		
START (assessment):	END (assessment):		
CAT/PEN ID	TYPE OF HOUSING (Individual/group)	PRESENCE OF SIGNS (0–5)	OBSERVED SIGNS

Adapted from original Fear Free Shelter Frustration Scale online manual,2019.

* Write down which active or passive signs are present. The list of them is found below.

HOW TO RECORD

The authors of this document propose to make recordings in such manner:

This is assessed **by observation**. Enter the room slowly and calmly, or approach the front of the pen and start observing each cat. Check for any presence of (active/passive) signs of FAS, listed in the table and count the occurrence of them in a minute. When recording, use the FAS scale. Make additional notes if necessary.

LOW SIGNS: 0 or 1: Normal behaviour patterns, friendly behaviour, normal eating behaviour, normal grooming behaviour, normal play behaviour, normal sleeping and resting behaviour, relaxed body posture, appropriate social interactions, readily acceptance of reinforcers (toys, treats, attention).

- **Level 0:** No signs of FAS, relaxed body posture and normal social contact.
- **Level 1:** Relaxed or mild signs of FAS (lip licking, avoiding eye contact, turning head away without moving away, partially dilated pupils. These signs **occur less than 4 times a minute**.

MODERATE SIGNS: 2 or 3: Hesitance, occasional meowing, occasional hiding, occasional pawing at the cage door, slight decrease in appetite, slight decrease in exploration, occasional avoidance of eye contact, fidgeting, difficulty settling.

- **Level 2**: 1 or 2 mild signs of FAS (ears slightly back or to the side, tail down, furrowed brow, slow movements or overly attention seeking. These signs occur less than 4 times a minute. Cat readily accept reinforcement (treats, toys, attention) and is soliciting in social interactions.
- **Level 3:** 2 or more moderate signs of FAS that occur more than 4 times a minute. May refuse reinforcements for brief moments, might take treats roughly at times. Hesitance to interact with others, but not actively avoiding them.

- **Level 4:** Severe signs of FAS without aggression, such as freezing or immobility, fidgeting, escape behaviour, dilated pupils, increased respiratory rate, trembling, tense closed mouth, ears back, tail tucked or trashing. Individuals may not accept reinforcers and are not interested in interactions; they might show active avoidance.
- **Level 5:** Severe signs of FAS (either ACTIVE or PASSIVE) with (defensive) aggression (growling, hissing, biting). Intolerant of procedures.

ACTIVE: High arousal, hissing, aggression, repetitive meowing and pacing, pawing, pushing or hanging on the cage, escape behaviours, disruption of cage contents. Fight, freeze or flight response.

PASSIVE: Hiding, feigning sleep or not moving, hypervigilance, avoiding social interactions, decreased play, under grooming or over grooming, decreased appetite, little to no interest in reinforcers (toys, treats, attention).

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DATE				CAT /PEN ID
A LIFE NOT WORTH LIVING	A LIFE WORTH AVOIDING	POINT OF BALANCE	A LIFE WORTH LIVING	A GOOD LIFE

DATE				CAT /PEN ID
A LIFE NOT WORTH LIVING	A LIFE WORTH AVOIDING	POINT OF BALANCE	A LIFE WORTH LIVING	A GOOD LIFE

DATE				CAT /PEN ID
A LIFE NOT WORTH LIVING	A LIFE WORTH AVOIDING	POINT OF BALANCE	A LIFE WORTH LIVING	A GOOD LIFE

DATE				CAT /PEN ID
A LIFE NOT WORTH LIVING	A LIFE WORTH AVOIDING	POINT OF BALANCE	A LIFE WORTH LIVING	A GOOD LIFE

DATE				CAT /PEN ID
A LIFE NOT WORTH LIVING	A LIFE WORTH AVOIDING	POINT OF BALANCE	A LIFE WORTH LIVING	A GOOD LIFE

DATE:				ASSESSOR:			
SHELTER:				REGION/TOWN:			
START (assessment):				END (assessment):			
CAT/PEN ID	Can we fulfil this cat's basic needs now, i.e. freedom from pain, safe and predictable environment, food and water etc?	What positive emotions or pleasure is this cat currently experiencing?	Can we provide the cat with more opportunities to experience positive emotions/pleasure ?	What negative emotions or distress is this cat currently experiencing?	Can we remove the things that cause the cat to experience negative emotions/distress?	What kind of quality of life does this cat currently has?	What quality of life will this cat have in the future?

This is assessed **by trained caretakers, by observation**. Enter the room slowly and calmly, or approach the front of the pen and start observing each chosen cat for five minutes.

Choose **the same cat** (which has been housed for at least 7 days) when making observations and look at positive and negative sensations and discuss where an individual cat sits on that scale. Make additional notes if necessary.

NOTES

ANNEX 12: KARNOFSKY SCALE: TABLE AND A QUESTIONNAIRE

DATE:		ASSESSOR:	
SHELTER: START (assessment):		REGION/TOWN:	
START (assessment):		END (assessment):	
CAT /PEN ID:			
Able to carry on normal activity and no special care needed	100	Normal activity, no evidence of disease	
	90	Able to carry on normal activity; minor signs or symptoms of disease	
	80	Normal activity with effort; some signs or symptoms of disease	
Unable to carry on normal activity; able to live at home and care for its needs; varying amount of assistance needed.	70	Cares for self; unable to carry on normal activity or to do active work	
	60	Requires occasional assistance, but is able to care for most of its needs	
	50	Requires considerable assistance and frequent medical care	
Unable to care for self; requires equivalent of veterinary care; disease may be progressing rapidly	40	Disabled; required special care and assistance	
	30	Severely disabled, hospital admission is indicated although death not imminent	
	20	Very sick; hospital admission necessary; active supportive treatment necessary	
	10	Moribund; fatal processes progressing rapidly	
	0	Dead	

HOW TO RECORD:

This is assessed **by veterinarians, by examination and scoring. Additional questionnaire can be fulfilled with the help of the caretakers, who are in everyday contact with the cat.** Choose the same cat (which has been housed for at least 7 days) when making observations.

STEP 1: Complete the scoring using the KPS tool above.

STEP 2: Review KPS Index Form and medical records to assess presence and extent of specific disease, signs and symptoms of each cat.

STEP 3: During assessment, observe the patient's subtle dependencies and interactions within the existing support networks.

STEP 4: Interview staff members/caretakers to obtain functional assessment information using questions (additional questionnaire p.104).

DATE:			ASSESSOR:	
SHELTER:			REGION/TOWN:	
START (assessment):			END (assessment):	
CAT/PEN ID	Has there been any weight loss?	Has there been any reduction in energy or increase in fatigue?	Has there been any difficulty grooming or bathing?	Has there been any difficulty in walking or moving around?

DATE:		ASSESSOR:		
SHELTER:		REGION/ TOWN:		
START (assessment):		END (assessment):		
CAT/PEN ID	SINGS OF HYPOTHERMIA*	SINGS OF HYPERTHERMIA*	OBSERVED SINGS	SEASON (Winter/Summer)

*SIGNS OF HYPOTHERMIA: Difficulty breathing, general weakness, shivering, cold skin, loss of consciousness, rigid and stiff muscles, low heart rate, low respiratory rate, lethargy, dilated pupils, huddling.

*SIGNS OF HYPERTHERMIA: Panting, restless behaviour (finding a cold spot), sweaty feet, drooling, excessive grooming, redness of the tongue and mouth, lethargy, vomiting.

This can be **physically** and **visually assessed** either by the **veterinarian, caretaker** or by the **trained assessor**, using additional tools (stethoscope, rectal thermometer, non-contact infrared thermometer), or conducting **behavioural observations**, focusing on the signs of potential hypothermia.

STEP 1: Gather the information about the environmental temperature from the shelter manager. Enter the enclosure (pen) or group housed environment, stand at least 2 meters in front of the pen and visually observe the animal and check for any presence of hypo or hyperthermia behavioural signs and accordingly check »Yes« or »No«.

STEP 2: Additionally check the health anamnesis of each animal in the animal checklist.

NOTES

DATE:			ASSESSOR:		
SHELTER:			REGION/TOWN:		
START (assessment):			END (assessment):		
CAT/PEN ID	DIARRHEA (Yes/No)	CATEGORY (Firm/Soft/Liquid)	VISIBILITY (Visible/Not visible)	ADDITIONAL HEALTH ISSUES	TYPE OF DIET

HOW TO RECORD:

This is assessed on an **individual** level, **by observation**. Calmly approach the front of the pen and search for any signs or presence of the visible liquid manure within the cat litter. Combine this measurement with the feeding regime (diet according to their age or special needs), as diarrhea can be a result of an inappropriate type of diet. Make additional notes if necessary.

NOTES

DATE:		SHELTER:	
ASSESSOR:		REGION/TOWN:	
START (assessment):		END (assessment):	
CAT/PEN ID	BODY CONDITION SCORE (0–9)	ADDITIONAL HEALTH STATUS	SHORT/LONG HAIRED**

** If the cat is longhaired, feeling its waistline is highly important, as it can be easy to assume they are under, or overweight, especially because the silhouette of the body is not clearly visible.

BCS CATEGORIES

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TOO THIN (1–4)

1. Ribs are very easily seen on short-haired cats. No palpable fat. Severe abdominal tuck. Lumbar vertebrae and wings of ilia easily palpated.
2. Ribs easily visible on short haired cats. Lumbar vertebrae are obvious. Pronounced abdominal tuck. No palpable fat.
3. Ribs are easily palpable with minimal fat covering. Lumbar vertebrae are obvious. Obvious waist behind ribs. Minimal abdominal fat.
4. Ribs palpable with minimal fat covering. Noticeable waist behind ribs. Slight abdominal tuck. Abdominal fat pad absent.

OPTIMAL (5)

5. Well-proportioned. Observe waist behind ribs. Ribs palpable with slight fat covering. Abdominal fat pad minimal.

OVERWEIGHT (6–7)

6. Ribs palpable with slight excess fat covering. Waist and abdominal fat pad distinguishable but not obvious. Abdominal tuck absent.
7. Ribs not easily palpated with moderate fat covering. Waist poorly discernible. Obvious rounding of abdomen. Moderate abdominal fat pad.

OBESE (8–9)

8. Ribs not palpable with excess fat covering. Waist absent. Obvious rounding of abdomen with prominent abdominal fat pad. Fat deposits present over the lumbar area.
9. Ribs not palpable under heavy fat cover. Heavy fat deposits over the lumbar area, face and limbs. Distention of abdomen with no waist. Extensive abdominal fat deposits.

DATE:				ASSESSOR:		
SHELTER:				REGION/TOWN:		
START (assessment):				END (assessment):		
CAT/ PEN ID	SWOLLEN AREAS	OPEN WOUNDS	AREAS OF HAIR LOSS	ECTOPARASITES	HAS THE CAT ANTIPARASITIC PERSCRIPTIONS?	OCCURENCE OF LICKING or SCRATCHING

The authors of this document propose to make recordings in such manner:

SKIN CONDITION: This is assessed **by observation**. Approach the individual cat in a standing position and view it from both sides and front and search for any evidence of swollen areas, open wounds, hair loss or ectoparasites. If the cat does not show any present skin abnormalities or issues, the scoring sheet can be left blank. When recording use the scoring sheet.

BODY CONDITION:

STEP 1: Enter the room and remain calm near the entrance for the first minute. Approach to the selected pen, slowly and calmly open the pen and present your hand (stop if the cat is obviously withdrawing).

STEP 2: Wait for the cat to approach and see if she wants to interact or not (Cat approach test).

STEP 3: Use your hands to gently touch body parts (chest, hips, abdomen and waist) included in the body condition scoring and make notes. Use the table above to make scores.

STEP 4: Combine these measurements with the health anamnesis (gastrointestinal problems, weight …) and feeding regime.

This assessment should be combined with the weight of the cat, health status/anamnesis, feeding regime, age and **ONLY** on cats that have been in the adoption/OPEN area, housed **individually**.

However, the person conducting these measurements is recommended to be always **the same**, to increase the reliability of the results.

NOTES

ANNEX 17: BODY MASS INDEX

DATE:	ASSESSOR:
SHELTER:	TOWN/REGION:
START (assessment):	END (assessment):

MEASUREMENTS					
CAT PEN/ID	HEAD CIRCUMFERENCE (cm)	THORACIC CIRCUMFERENCE (cm)	FRONT LEG CIRCUMFERENCE (cm)	FRONT LEG LENGTH (cm)	HIND LEG LENGTH (cm)	BODY LENGTH (cm)

HOW TO RECORD

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There are 6 feline body mass index measurements, which must be accurate to ensure accurate results. Measure as close as possible to skin. Recordings must be done in centimetres to one decimal point.

This can be assessed by **veterinarian, trained caretaker, trained cat breeder** or even **trained cat owner**. However, the person conducting these measurements must always be **the same**, to increase the reliability of the results. Each assessor should use the table of classification and other required equipment such as:

- Measuring tape (It should be snug, but not so much that it causes an indentation)

- Feline Body Mass Calculator/Table

- Table of proper weight categories

STEP 1: Weight the cat and take morphometric body measurements as shown on the pictures below.
STEP 2: Use the resources to determine BFI, such as GRAPHS, IMAGES and CALCULATOR (found on the internet).
STEP 3: Use the table to make the proper categorisation.
STEP 4: Combine these measurements with the health anamnesis, age and feeding regime of the selected at.

HEAD CIRCUMFERENCE

Measure circumference by placing tape equidistant between eyes and ears at the widest part of head.

_____ cm
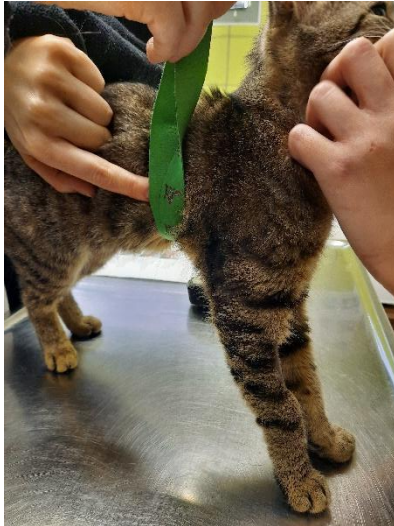
THORACIC CIRCUMFERENCE

Measure the girth at the level of heart (-6th-7th rib, just behind the elbow).

_____ cm

FRONT LEG CIRCUMFERENCE

Measure circumference at midpoint between carpus and elbow.

_____ cm

FRONT LEG LENGTH

Measure from proximal edge of central foot pad to point of elbow (olecranon process). Carpus must be straight.

_____ cm

HIND LEG LENGHT

Measure from proximal edge of central foot pad to tip of hock (dorsal tip of calcaneal process). Tarsus must be straight.

_____ cm

BODY LENGHT

Starting from the base of the tail measure along the dorsal midline following contours of back, neck and head to the proximal edge of the nose pad.

_____ cm

ANNEX 18: MUSCLE CONDITION

DATE:		SHELTER:	
ASSESSOR:		REGION/TOWN:	
START (assessment):		END (assessment):	
CAT/PEN ID	MUSCLE CONDITION SCORE (Normal/Moderate/ Mild/Severe)	ADDITIONAL HEALTH STATUS	SHORT/LONG HAIRED**

** If the cat is longhaired, feeling it's waistline is highly important, as it can be easy to assume they are under, or overweight, especially because the silhouette of the body is not clearly visible.

This assessment should be combined with the weight of the cat, health status/anamnesis, feeding regime and **ONLY** on cats that have been in the adoption/OPEN area, housed **individually**.

This can be assessed by **veterinarian, trained caretaker, trained cat breeder** or even **trained cat owner**. However, the person conducting these measurements must always be **the same**, to increase the reliability of the results.

STEP 1: Enter the room and remain calm near the entrance for the first minute. Approach to the selected pen, slowly and calmly open the pen and present your hand (stop if the cat is obviously withdrawing).

STEP 2: Wait for the cat to approach and see if she wants to interact or not.

STEP 3: Read THE MANUAL and watch the VIDEO INSTRUCTION (found above p. 67) carefully and use your hands to gently touch body parts (back, head, hips, abdomen) and make notes.

STEP 4: Combine these measurements with the health anamnesis (gastrointestinal problems, weigh …) and feeding regime.

NOTES

DATE:				ASSESSOR:				
SHELTER:				TOWN/REGION:				
START (assessment):				END (assessment):				
COAT CONDITION				ANTIPARASITICS				
CAT PEN/ID	DIRTY	SHAGGY/ MATTED	1 BALD SPOT/ MULTIPLE BALD SPOTS	NAME	VALIDITY (months)	EFFICIENCY DEADLINE	APPLICATION (Regular/irregular)	ADDITIONAL HEALTH STATUS (Allergies)

Assess the coat condition **by observation** using the scoring sheet. Approach the individual cat in a standing position and view it from both sides and front and search for any parts of the coat that might be dirty, wet or without hair. Make additional notes if necessary.

Combine the observations with the health anamnesis and feeding regime.

NOTES

DATE:				ASSESSOR:	
SHELTER:				TOWN/ REGION:	
START (assessment):				END (assessment):	
CAT/PEN ID	EYE DISCHARGE	NOSE DISCHARGE	EAR DISCHARGE	TYPE OF THE DISCHARGE*	TREATMENT (Daily, 1 x per day, 2 x per day)

*TYPE:

EYE AND NOSE: Serous, mucous, purulent or bloody

EAR: Black, brown, cream coloured, irregularly pigmented

The authors of this document propose to make recordings in such manner:

This is assessed **by observation**. Calmly approach the front of the pen and check for any presence of signs of the eye/nose/ear discharge. Combine the measurements with the health anamnesis and health records. When recording, use the scoring sheet above.

TYPE OF DISCHARGE

- **SEROUS:** Clear, watery and transparent (due to a viral infection).
- **MUCOID:** Cloudy, yellow and mucous-like (due to bacterial infection).
- **PURULENT:** Green, yellow and thick (due to bacterial infection).
- **SANGUINEOUS:** Bloody and it might look like a red-coloured sleep crust, wet and wrinkled (due to injury of the eye or the mucous).

NOTES

DATE:		SHELTER:	
ASSESSOR:		REGION/TOWN:	
START (assessment):		END (assessment):	
CAT/PEN ID	COUGHING (Yes/No)	SNEEZING (Yes/No)	

HOW TO RECORD

The authors of this document propose to make recordings in such manner:

Assessor should **visually observe** each individual animal, standing 2 meters in front of the pen, using a score sheet. Observe and search for any evidence of cats coughing and sneezing.

NOTES

DATE:			SHELTER:			
ASSESSOR:			REGION/TOWN:			
START (assessment):			END (assessment):			
CAT/PEN ID	VOMITING (Yes/No)	LETHARGY (Yes/No)	REFUSAL OF FOOD (Yes/No)	FEVER (Yes/No)	DROWSINESS (Yes/No)	GENERAL DECREASE IN ACTIVITY (Yes/No)

The authors of this document propose to make recordings in such manner:

This is assessed in the **quarantine area** (if the assessor has an access). Assessor should **visually observe** each individual animal, standing 2 meters in front of the pen using a score sheet. Observe and search for any evidence of sickness behaviours. Check the health anamnesis and daily care. Make additional notes if necessary.

NOTES

DATE:			SHELTER:		
ASSESSOR:			REGION/TOWN:		
START (assessment):			END (assessment):		
CAT/PEN ID	BEHAVIOURAL RESPONSES TOWARD THE SIDE OF THE INJURY (Yes/No)	OBSERVED BEHAVIOURS	ANALGESIC RECIEVEMENT (after admission) (Yes/No)	ANALGESIC RECIEVEMENT (after neutering/spaying) (Yes/No)	AT WHAT TIME AFTER THE ADMISSION DID THE CAT RECIEVE AN ANALGESIC

*BEHAVIOURS:

- Increased grooming (touching, smelling, licking) in specific area
- Avoidance of handling and decreased tolerance for physical contact
- Vocalisation (frequent plaintive or urgent sounding miaow, groaning, hissing, growling)
- Lameness and regional sensitivity
- Reduction in movement and activity
- Increased hiding
- Decreased interest in positive stimuli (play, social interaction)
- Changes in body posture and their lying positions (crouching, lowering of the head, squinting or closing the eyes, flattening of the ears, compression of the muzzle area)

HOW TO RECORD

The authors of this document propose to make recordings in such manner:

Assessor should **visually** observe each individual animal, standing 2 meters in front of the pen using the score sheet above. **It is recommended to observe hospitalised cats that have been in surgery, are injured, or ill.** Observe and search for any evidence of behavioural responses, which reflect that the cat is in pain. Combine this information with the information about analgesics treatment.

The goal of this table is to focus on the proper care upon admission of cats to the shelter. If this information cannot be obtained, use the next method (Feline Grimace Scale) and make recordings. Make additional notes, if necessary.

NOTES

ANNEX 24: FELINE PAIN GRIMACE SCALE

DATE:	SHELTER:	
ASSESSOR:	REGION/TOWN:	
START (assessment):	END (assessment):	
CAT/PEN ID	FGS (0–2)	

0: Ears are facing forward, eyes are opened. Muzzle is relaxed (round shape). Whiskers are loose and curved and the head is above the shoulder line.

1: Ears are slightly pulled apart. Eyes are partially opened. Muzzle is mildly tense and the whiskers slightly curved or straight. Head is aligned with the shoulder line.

2: Ears are flattened and rotated outwards; eyes are squinted eyes. Muzzle is tense (elliptical shape) and the whiskers straight and moving forward. Head is below the shoulder line or tilted down (chin towards the chest).

HOW TO RECORD

The following guidelines are based on the original guidelines for FGS, available online:

Observe the cat undisturbed for 30 seconds and then score. If the cat is grooming, eating or vocalising, wait until these activities are finished before scoring. If a cat is sleeping, leave it undisturbed and wait until it is awake. Each action unit is individually evaluated and scored as '0' (action unit is absent), '1' (action unit is moderately present or there is uncertainty over its presence) or '2' (action unit is obviously present). Combine the observations with the health anamnesis and treatment (receivement of the analgesics and daily monitoring). See examples of each action unit scored as '0', '1' or '2' in the table above.

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10.   **Appendix 2**

DECLARATION OF ANIMAL SHELTERS TO PARTICIPATE IN THE MASTER'S RESEARCH PROJECT ON THE WELFARE ASSESSMENT OF CATS IN SLOVENIAN SHELTERS.

Signed by (Name and Surname of the shelter manager) _____,

employed at (official name of shelter) _____,

at _____ , in the facility of which I am the manager,

I declare that we, as an Animal shelter, have been fully informed about the progress of the research work of the master's thesis of the student of the master's programme Human-Animal Interactions, Helena Pauko, and we have unanimously agreed to participate in the cooperation. We have received the full protocol in advance for reading and thus a detailed description of all the evaluation methods and procedures that the evaluator will carry out in the course of the research.

The research work will consist of assessing the welfare of cats in Slovenian animal shelters, using and testing the developed protocol, from April 2022 to June 2022.

The fieldwork will allow the evaluator to refine and improve the protocol to assess which evaluation methods are appropriate and which are not.

Maribor, on_____ .

Signed

_____