UNIVERSIDADE DE LISBOA

Faculdade de Medicina Veterinária

IDENTIFYING GOOD PRACTICES, PRACTICES TO IMPROVE, AND PRACTICES CONSIDERED RISK ALERTS, CONCERNING MEDICAL AND BEHAVIOUR ASPECTS OF ANIMAL WELFARE IN A SAMPLE OF SHELTERS IN PORTUGAL AND THE UK

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DISSERTAÇÃO DE MESTRADO INTEGRADO EM MEDICINA VETERINÁRIA

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“Be the change you wish to see in the World”

Mahatma Gandhi

Acknowledgments

To say that this has been quite a journey would be an understatement. Starting with a never-ending secondary school, going through a first course that was condemned to failure from the beginning - as my true and only call was to be surrounded by animals - I guess most believed that after concluding my studies as a veterinary nurse, I would say “enough is enough”.

But it seems like Veterinary Medicine was meant to be, and 6 years ago, I started my new life in FMV.

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To all those I shall meet and help, because this is all for them as well.

Identificação de boas práticas, práticas a melhorar e alertas de risco, de condições médicas e comportamentais que afetam o bem-estar animal em abrigos de Portugal e do Reino Unido

Resumo

Um inquérito foi realizado de Janeiro a Abril de 2016, para avaliar problemas do foro médico e comportamental, em cinco abrigos portugueses e em quatro abrigos do Reino Unido. Uma aplicação informática, gratuita, *online*, UC-Davis Virtual Consultant™, foi utilizada e adaptada para construir um questionário com 78 perguntas, com o objetivo de identificar boas práticas (GP), práticas a melhorar (TI) e alertas de risco (RA) para condições médicas e comportamentais em cães e gatos.

Entre as 502 diferentes respostas obtidas, a classificação mais atribuída foi a de GP (77,5%), quer relativamente às condições médicas (80,2%) quer às comportamentais (75,1%), no Reino Unido (85,5%) ou em Portugal (71,7%), o que são resultados encorajadores. A saúde comportamental foi a categoria de respostas que mais influenciou negativamente o resultado final, alertando para a urgência de uma intervenção rápida e melhoria, sobretudo nos abrigos portugueses.

Os ingleses revelaram melhores índices de GP nas condições médicas (83,8%) e na saúde comportamental (87,1%) do que os abrigos portugueses classificados, respetivamente, com 77,4% e 66,7%.

As principais falhas de saúde identificadas foram: *check-up* médico à entrada no abrigo; exames clínicos periódicos após o acolhimento; desinfeções entre exames clínicos. Alertas de risco associados à vacinação só surgiram nos abrigos de gatos, porém, uma heterogeneidade preocupante foi detetada no *timing* e na periodicidade das vacinações em cachorros e gatinhos.

Os temas clínicos mais controversos foram as castrações pediátricas e na saúde comportamental a gestão dos gatos ferais e dos cães agressivos. As práticas a melhorar, mais frequentes, de saúde comportamental foram: competências individuais de reconhecimento de linguagem corporal e de outros comportamentos, sugestivos de stress, dor e sofrimento; enriquecimento ambiental; promoção da sociabilização de cães e gatos com animais e pessoas; uso coletivo de espaços de recreio.

Um relatório final foi disponibilizado aos responsáveis dos abrigos, informando-os da avaliação das suas práticas diárias, fornecendo-lhes soluções práticas, priorizadas e direcionadas para melhorarem a saúde e o bem-estar animal das suas populações, e para os ajudar a empreenderem mudanças positivas.

Palavras-chave: Abrigos, Inglaterra, Portugal, bem-estar animal

Identifying good practices, practices to improve, and practices considered risk alerts, concerning medical and behaviour aspects of animal welfare in a sample of shelters in Portugal and the UK

Abstract

A survey was carried out on five Portuguese shelters and four United Kingdom (UK) shelters, from January to April 2016, to assess behavioural and medical problems.

A free web-based tool, the UC-Davis Virtual ConsultantTM, was used and adapted to build a comprehensive seventy-eight questions questionnaire to identify good practices (GP), practices to improve (TI), and practices considered as risk alerts (RA) for medical and behavioural problems of dogs and cats.

Amongst the 502 different answers collected, the proportion of GP was the most rated (77.5%), both in medical (80.2%) and behavioural health (75.1%), either in the UK (85.5%) or in Portugal (71.7%) which are encouraging results.

Behavioural health was the category that most influenced negatively the outcome, pinpointing the need for quick intervention and improvement, namely on Portuguese shelters.

UK ones showed a better percentage of GP in medical (83.8%) and behavioural health (87.1%) than the Portuguese shelters that scored respectively 77.4% and 66.7%.

Major health areas of concern were: health check-up on intake; routine re-examinations after sheltering; hygiene methods between clinical exams. Vaccination risk alerts were only found in cat shelters. Yet a worrisome heterogeneity was detected at the timing and period of vaccination.

Key controversial matters of medical health were pediatric spay and neuter, and shelter strategies to deal with feral or aggressive animals for behavioural health. Most rated behavioural practices to improve were: ability to recognize body language and other behaviours indicating animal stress, pain and suffering; environmental enrichment; promoting dog and cats social contact with conspecifics and people; use of play groups.

A final report was displayed to inform shelter managers about the evaluation of their everyday practices, to provide them with practical and targeted solutions to improve health and animal care of their populations, and to help them making positive changes.

Keywords: Shelter, survey, UK, Portugal, animal welfare

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List of abbrevitions

ASPCA- American Society for the Prevention of Cruelty to Animals

ASV- Association of Shelter Veterinarians

BSAVA- British Small Animal Veterinary Association

BSL- Breed Specific Legislation

CAV- Canine Adenovirus

CDV- Canine Distemper Virus

CPiV- Canine Parainfluenza Virus

CPV- Canine Parvovirus

CRO- Centro de Recolha Oficial

DGAV- Direcção Geral de Alimentação e Veterinária

FCV-Feline Calicivirus

FFP – Feline Facial Pheromone

FHV-Feline Herpesvirus

FLUTD - Feline Low Urinary Tract Disease

FPV- Feline Panleukopenia Virus

GP- Good Practice

GI- Gastrointestinal

ICAM- International Companion Animals Management

IFA- Immunofluorescent Antibody

IHC- Immunohistochemistry

ISFM- International Society of Feline Medicine

LOS- length of stay

LRR- Live Release Rate

MDA- Maternally Derived Antibody

MLV- Modified Live Vaccines

NGO- Nongovernmental Organization

OIE - World Organization for Animal Health

QoL- Quality of Life

UK- United Kingdom

USA- United States of America

RA- Risk Alert

RSPCA- Royal Society for the Prevention of Cruelty to Animals

RT-PCR – Real Time- Polymerase Chain Reaction

SOP – Standard Operation Procedure

TI- To Improve

TNR- Trap Neuter Return

WBC- White Blood Cells

CHAPTER I - ACTIVITIES DURING THE INTERNSHIP

The internship took place in the UK, from January 11th of 2016, to the beginning of April of the same year. The author was supervised by Jenny Stavisky, from the Faculty of Veterinary Medicine of The University of Nottingham. Since the aim was to learn as much as possible about Shelter Medicine in the UK, the internship was split in several parts, beginning with a four week placement at the Royal Society for Prevention of Cruelty to Animals (RSPCA) Greater Manchester Animal Hospital.

The RSPCA is the oldest animal welfare organization in the UK, existing since 1824. Its work includes: investigation and eventual prosecution of animal cruelty cases, led by the RSPCA inspectors; providing veterinary care to stray and abandoned animals, as well as reduced cost veterinary assistance to animals whose owners have economic difficulties and are eligible to receive these services. They also rescue several species, including cats, dogs, rabbits, ferrets, farm animals, horses and wildlife, and have several centres around the UK, including shelters, hospitals and small clinics.

The Greater Manchester Animal Hospital assists stray animals, as well as those brought by the inspectors in cases of animal cruelty or negligence. The general public eligible for veterinary assistance may also benefit from the hospital services, with emphasis to neutering, microchipping and vaccination at reduced cost. The hospital runs a 24h permanent service, but several days are dedicated to specific services, such as mondays for dog castration clinic, fridays for cat neutering clinic, or the wednesday mornings for vaccination clinic. On these days, people can bring their pets in without previous scheduling.

The author performed the following activities: male cat castrations, with both the open and closed technique, male dog castrations using the open technique and one female cat and one female dog ovariohysterectomy (figure 1). When not on surgeon duty, the author would restrain, sedate, intubate, prepare the surgical site and monitor the anaesthesia, as well as the post-operation monitoring of the patients. Other activities included performing and assisting consultations both in the Hospital and in small local RSPCA clinics (Wigan and Bolton), where the author conducted several consults, under supervision. The consults were mainly vaccinations and minor problems. It was also possible to get involved in the “Multicat Households Project”. The aim of this project is to identify animal hoarders, and provide them with help mainly through education about conscious animal ownership, as well as spaying the female cats.

The next placement was at the Stubbington Ark RSPCA animal shelter, part of the Solent branch, in Hampshire. For three weeks, the author partook in several different activities at the shelter. This one takes in several species besides cats and dogs, such as rabbits, ferrets, small

rodents such as gerbils and guinea pigs, birds, farm animals and even wildlife, such as hedgehogs and swans. Most days were spent at the veterinary unit (fully equipped with infirmary, consultation room, a pre-surgery room where the dental surgery was performed, surgery room and a X-ray, echography and laboratory room), assisting surgeries, such as cat, dog and ferret ovariohysterectomies and castrations (also in guinea pigs). Besides inducing, intubation and monitoring, some surgeries were performed by the author, such as castrations on dogs (this time with a closed technique), several cat ones and even on a ferret (figure 2). Everyday there were “vet rounds”, where the author helped the veterinarian observing animals with certain conditions, mainly cats with “cat flu”, as there was a strict control program in the shelter for this disease.. The dogs would go to the veterinary unit instead. The author also had the opportunity of accompanying the procedures that are followed whenever an animal is brought in by an RSPCA inspector.

Apart from working with the veterinarian and nurses, the author spent a day in each department: dogs, cats and miscellaneous (small mammals and birds), helping with the cleaning, feeding, interacting with the animals (socializing with small rabbits and ferrets), assisting with the environmental enrichment of cats and dogs, dog walking, and overall, learning about the everyday routines of the different departments inside the shelter.

The last five weeks were spent at the Faculty of Veterinary Medicine of Nottingham University, were the days were spent outlining the questionnaire and doing bibliographic research. The author also participated in the Faculty´s initiative “Vets in the community”, which is run by students and aims to provide free routine veterinary care for the pets of homeless and vulnerably housed people in Nottingham. The clinics occur twice a month and are managed and run by a committee of Nottingham Veterinary School students, under the supervision of staff members. The day´s clinics included vaccines, de-wormings, other basic treatments, and also delivery of food, toys and warm clothing for the animals, which are donated by sponsors.

A day was spent at Dogs Trust Loughborough, learning about the daily routine of the shelter veterinarians and shelter behaviourist and trainers, as well as about the infrastructures of the shelter, including the intake area, the dog parks and the special housing for dogs with behaviour issues.

Besides these shelters, the author visited the Derby Cats Protection on two different occasions, a NGO with several shelters around the UK, only for cats. In total, the author visited six different shelters in the UK.

Other activities included exploring the clinical skills laboratory at the Faculty, participating on the Association of Charity Vets Conference in London, where it was possible to assist to several communications and workshops, and joining the BSAVA congress in Birmingham.

Figure 1. Performing a dog orchiectomy at Greater Manchester Hospital RSPCA (left). Bitch spay performed at Liverpool RSPCA, UK (right) (original)

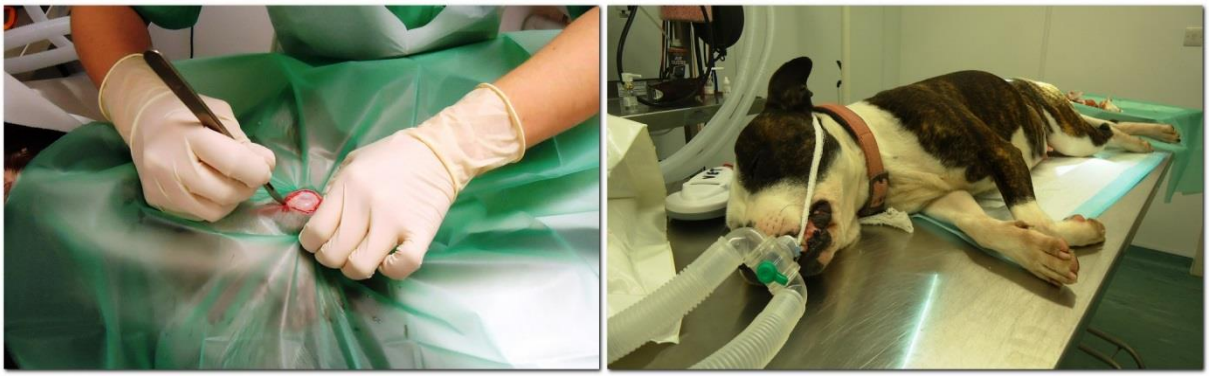


Figure 2. Ferret anaesthesia (left) and ferret castration (right), performed at The Stubbington Ark, UK (original)

CHAPTER II - LITERATURE REVIEW

1. Introduction

1.1. What is Shelter Medicine?

According to the Association of Shelter Veterinarians, shelter medicine "*is a field of veterinary medicine dedicated to the care of homeless animals in shelters or other facilities dedicated to finding them new homes".* While in companion animal medicine the main focus in on the individual pet, shelter medicine can be seen as population medicine. So, in the words of Doctor Griffin, professor of Shelter Medicine at the University of Florida, College of Veterinary Medicine, it can be seen as "a *very unique blend of population and individual health care",* where the main objective is to release both physically and behaviourally healthy animals in the communities (Griffin, as cited by Nolen, 2014).

Shelter medicine is a complex field, where all its components linked together, form a puzzling and extraordinary challenge. While still in its first years as a subject, it has been growing immensely over the last 15 years, particularly in the United States of America. The first formal class in shelter medicine was taught in 1999, at Cornell University. In 2001, the Association of Shelter Veterinarians was established, including with members of several different countries. Since 2014, it has become a recognized specialty by the American Board of Veterinary Practitioners, and is offered as a postgraduate internship and residency in many veterinary colleges in the United States of America (USA) (Nolen, 2014).

To the author´s knowledge, this is not so advanced in other countries, even though for some, first steps are being made. In Brazil there is a residency program in shelter medicine at the University of Paraná. For Europe, the available information is scarce. In the UK it is becoming an important field, and several veterinary faculties are starting to offer shelter medicine classes, and establishing protocols with animal shelters. In Italy, first steps toward a new welfare assessment protocol for practical application in long-term dog shelters are being taken, conducted at the *Istituto Zooprofilattico Sperimentale* (Barnard, Pedernera, Velarde & Dalla Villa, 2015). Even though there may be increasing demand for shelter medicine training in Portugal, it is not possible, to date, to pursue such studies through any Portuguese university.

1.2. Definition of an animal shelter

A shelter may simply be defined as "*an establishment that houses and feeds stray animals*" (Merriam-Webster Dictionary). While different organizations may have different aims and objectives, there are general essential elements that should be included in a shelter program, such as: aiding shelter stray and homeless animals; helping families reunite with their lost pets;

rescuing animals in danger or situations of neglect; adopting out healthy and behaviourally sound animals to responsible homes; humanely euthanasia of suffering animals whenever necessary; incentivizing the public to spay and neuter their pets; and developing education programs to help prevent stray animals. Depending on the country, some shelters, namely county shelter may also: respond to nuisance complains related to animals; investigate and help to enforce laws related to public health and animal welfare, in collaboration with the local or regional authorities and promote the identification of pets (Handy, 2001).

There is a lack of definition regarding animal sheltering types, and not all animal aid groups have shelters in the first place, as is the case of many rescue groups and NGO´s. However, they can be divided in two main types: 1) County shelters, also known as official animal control agencies, controlled by the Government, whose main focus is usually Public Health and citizen safety. They were frequently known as "the pound". Fortunately this seems to be changing, as many county shelters are more concerned about animal welfare, and work towards to set up good adoptions practices. 2) Humane Societies that may also be known as NGOs. Among these, other definitions exist, such as rescue groups, re-homing centres and sanctuaries. Rescue groups may often be non-official groups of people who fundraise and help certain shelters, sometimes focusing on specific animals or breeds (free-roaming cats, or bull-type dog breeds for example). In Portugal, many of these groups do some fostering, which is considered within the spectrum of shelter medicine. Re-homing centres usually focus on adopting out animals to good homes, while a sanctuary´s main purpose is to keep animals during their life span, with the best possible quality of live (Santos, 2010).

1.3. The role of the Shelter Veterinarian

The range of knowledge and training of a shelter veterinarian should include: preventive medicine, such as intake procedures and decisions, vaccination and deworming; infectious diseases outbreak management; husbandry, including housing, nutrition and sanitation; shelter design; population management; internal medicine; "high-quality, high-volume" spay and neuter; behavioural health and environmental enrichment; public health; animal welfare, cruelty and legislation. More importantly, a shelter veterinarian must know how to connect all these fields, e.g., a vaccination protocol is only as good as the shelter's biosecurity program, which includes proper sanitation, housing and population management (L. Miller & Zawistowski, 2013).

1.4. A brief revision of Animal Protection and Sheltering in the UK

The UK was probably one of the pioneers regarding animal protection. In 1824, the world´s first animal charity was established, the SPCA, renamed in 1840 as the RSPCA. The first

animal welfare law was passed in 1882, it was a law named “Martin´s Act”, that forbade “the cruel and improper treatment of cattle”. It was extended in 1835 to dogs and other domestic animals, known as “Pease’s Act”. Throughout the years, many other laws were passed, involving laboratory animals, hunting and fur farms. At the present, it is the Animal Act 2006 that legislates the protection of animals in the UK. (RSPCA, n.d.)

In 1965, the concept of the “five freedoms” (Table 1) was developed in the UK, nowadays a part of the Farm Animal Welfare Council. It is a concept broadly accepted by many organizations around the world as welfare basis, including the Association of Shelter Veterinarians (ASV), whose “Guidelines for Standard of Care in Animal Shelters” were written based upon the five freedoms.

Table 1. The Five Freedoms (adapted from the Farm Animal Welfare Council, 2009)

1. Freedom from Hunger and Thirst	By ready access to fresh water and food to maintain full health and vigour.
2. Freedom from Discomfort	By providing an appropriate environment including shelter and a comfortable resting area
3. Freedom from Pain, Injury or Disease	By prevention or rapid diagnosis and treatment of diseases
4. Freedom to Express Normal Behaviour	By providing sufficient space, proper facilities and company of the animal's own kind
5. Freedom from Fear and Distress	By ensuring conditions and treatment which avoid mental suffering.

Complementing the Animal Act 2006, the Department for Environment, Food and Rural Affairs, published two codes of practice for the welfare of dogs and cats. These are based upon the “five freedoms” and their purpose is to provide practical guidance for tutors to comply with the provisions of the Act´s section 9. Therefore, it is applicable to all cats and dogs (DEFRA, 2009).

In addition to this Act, there is the Dangerous Dogs Act 1991, a breed specific legislation that preconizes strict control measures to owners of dogs belonging to certain breeds, traditionally selected for fighting, namely the “*Pit Bull Terrier type*” dogs and the *Japanese Tosa*, and also including the *Dogo Argentino* and *Fila Brasileiro*. This act prohibits their breeding, selling, exchange or offer (Dangerous Dog Act, 1991), meaning that all animals deemed to belong to these breeds, who enter the re-homing system, are to be destroyed and cannot be given up to adoption. However, many voices have risen and continue to rise against these measures, stating that these laws are ineffective in protecting Public Health and there is no robust data

that these breeds "*are more involved, or are any more likely to be involved, in dog bite related incidents than any other breed or type in the UK"*. Adding to this, there is evidence that despite this Breed Specific Legislation (BSL), dog bite incidents have been increasing, as reported by the RSPCA (RSPCA, 2016). Battersea Dogs and Cats Home, one of the oldest welfare organizations in the UK, also produced a report similar to that of the RSPCA. They did a survey targeting professional canine behaviourists and trainers across the country, and the conclusions were that the Dangerous Dog Act is not in accordance to current expert advice, and that measures such as education and compulsory training of dog tutors would be much more effective in protecting the public (Battersea Dogs & Cats Home, 2016).

In the UK, law dictates that stray dogs shall be taken by local authorities to dog wardens (official council control), who are responsible for the return of the animals to their owners. When not claimed, they spend a mandatory seven day hold period at the shelter, and depending on the council, they may be rehomed, passed on to re-homing centres or submitted to euthanasia (Dogs Trust, 2014). It is estimated that around 10 million pet dogs, and approximately the same number of pet cats live in the UK (Murray JK, Roberts MA, Whitmars A, Gruffydd-Jones TJ, 2009). Dogs Trust makes an annual stray dog survey, collecting data form local authorities, meaning that these figures relate only to dog wardens. An estimated population of 81.000 stray dogs was made between 1st April 2015 and 31st March 2016, the previous year counting 102.500, and 126.000 in 2011. Out of those 81.000 animals, approximately 54% were reunited with their owners; 6.143 (9%) were re-homed by the authorities, and around 22% were passed on to welfare organizations and re-homing centres. Approximately 3.199 dogs (4%) were euthanized (Dogs Trust, 2016).

Stavisky *et al* (2012) found that there are nearly 1.380 animal welfare organisations in the UK (charities with the components of housing or rehoming of dogs and cats, or trap-neuter-return programs for cats), of which 41.8% are breed-specific rescues. Regarding the source of these animals, a survey was made including 536 organizations, which revealed that 56.3% of the dogs and 45.1% of the cats were surrendered by their owners, and 25.8% of the dogs and 42.3% of the cats were found as stray or lost. These organizations cared for an overall number of 89.571 dogs and 156.826 cats in total, although data collection in the UK is not easily achievable, as licensing of shelters in the country is not legally required (Stavisky, Brennan, Downes, & Dean, 2012).

1.5. A brief revision of Animal Protection and Sheltering in Portugal

In Portugal, the highest entity responsible for animal welfare is DGAV (Direcção Geral de Alimentação e Veterinária), a branch of the Ministry of Agriculture. Several laws regulate the protection of companion animals, namely "Decreto-Lei 276/2001" and "Decreto-Lei 315/2003",

which describe the general norms for detention, housing, handling, surgical interventions, seizure and euthanasia. The “Decreto-Lei 260/2012” assembles the norms concerning the official seizure centres (commonly known as municipal shelters) and private shelters (DGAV, 2016). Article 19 of “Decreto-Lei 260/2012” dictates that it is the Council’s responsibility the seize and euthanasia of companion animals, when serious issues with Public Health arise. The animals should be brought to the Council’s “Centro de Recolha Oficial” (CRO), which are the official capture centers, where dogs and cats should be held for a period of eight days. If no one reclaims the animal by that time, the responsible Veterinary should decide their destination: adoption, release to charity organizations or euthanasia (DL 260/2012). Portugal also has breed specific legislation: Law 46/2013 and “Portaria 422/2004”, listing seven potentially dangerous dog breeds, whose owners must abide to strict norms. Contrary to what happens in the UK, there is no reference in the law that prohibits the adoption of dogs belonging to these breeds.

In 2014, a new law that criminalizes cruelty to animals was approved (Law 69/2014), and more recently (August 2016), new legislation was approved, prohibiting the euthanasia of dogs and cats as a population control measure in Council´s CRO. Therefore, official centers will no longer be allowed to euthanize animals for economic reasons, overpopulation and or/space constraints. The councils have two years to prepare before the law is effective (Law 27/2016).

Licensing of both official centers and private shelters is the responsibility DGAV. There are approximately 136 licensed CRO (both in main land and Islands), which may seem like a high number, but still many Councils do not have one. As for private shelters, approximately 38 shelters are licensed, even though not all of them are re-homing centers, some are just people who need this license to own more than 3 dogs (DGAV, 2016).

Regarding the numbers of unwanted pets in Portugal, the DGVA only makes available some data regarding the CRO (Table 2), but even that information is incomplete. There is no available information about the proportion of stray, animals relinquished by the owners, or from other sources.

Table 2. Data concerning animals housed in CRO and respective outcomes**.** (Gently granted by Professor Yolanda Vaz, DGAV 2016)

Year	Dogs Housed in CRO	Dogs returned to owners	Adopted dogs	Euthanized dogs	Cats housed in CRO	Cats returned to owners	Adopted cats	Euthanized cats
2013	23.632	1.724	8.407	11.837	6.138	340	2.136	2.821
2014	24.579	1.786	8.768	11.978	6.947	401	3.466	2.302

2015	23.714	1.944	9.263	10.088	6.486	184	3.289	1.987

1.6. Animal Welfare

Animal welfare is a term that can assume different meanings depending on the context and the people using it, be it veterinarians, consumers or politicians. Though its definition may vary, it transversally includes the physical and psychological well-being of animals. (Hewson, 2003). Other terms have been suggested , such as Quality of life (QoL), happiness or well-being, but they all can be simplified to the concept that *"the animal feels good and enjoys life*" (McMillan, 2013).

1.6.1. Welfare and QoL Assessment

Measuring welfare and QoL is a great challenge for animal shelters. Even though there has been a lot of research describing welfare indicators in the last years, mainly based on physiological and behavioural parameters (Dalla Villa et al., 2013a), a more lot remains to be studied. Although there is a lot of data available, the shelter environment is characterised by such a high number of variables, that it makes the identification of general and individual welfare indicators a difficult task (Cafazzo et al., 2014).

Some studies have focused on plasma, salivary and urinary cortisol as a measure of stress(Beerda, Schilder, van Hooff, de Vries, & Mol, 1998), but they are considered non-specific , and may not reflect an emotional state. Conversely, behavioural patterns found in shelter dogs have been suggested to being correlated to poor welfare, such as excessive auto-grooming and vocalisations (Dalla Villa et al., 2013a). When matching dog behaviour with physiological parameters, results are confusing and not consistent (Hiby, Rooney, & Bradshaw, 2006), which may be due to the fact that cortisol is dependent on temporal context, being used as an acute stress indicator (Hennessy, 2013). Measuring oxidative stress has been suggested as a physiological indicator for chronic stress, even though there is scarce information relating behaviour and oxidative status. However Caffazo et all (2014) related, the improvement of shelter dog´s welfare through daily interaction with humans and daily walks, including lower frequencies of displacement behaviours and stereotyped behaviour. Another different approach has been the assessment of positive emotions in animals to improve their welfare. It is suggested that by promoting positive experiences, such, as physical, social and cognitive enrichment animal health and quality of live can be improved (Boissy et al., 2007).

The International Companion Animals Management (ICAM) coalition did a literature review on validated, reliable and feasible dog welfare indicators, such as: body condition score; visible skin conditions; presence of open wounds; presence of infectious diseases; dog-dog aggression; amicable social behaviour (such as play); dog-human interactions (positive and

negative) and qualitative behaviour assessment (ICAM coalition, 2014). Assessing the QoL through a list of nine signs of a desirable QoL is also suggested as a welfare assessment for shelter animals, including: alertness; range of the specie's appropriate context and age behaviour; low range or absence of unpleasant or abnormal behaviour; sleeping and eating patterns and physical health (McMillan, 2013).

1.6.2. Tools for welfare assessment

Although several indicators have been studied, there are not many tools developed yet specifically for measuring or assessing animal welfare in shelters, even though some were already developed for dogs. Barnard, C. Pedernera, Velarde, & P. Dalla Villa, (2014) proposed a welfare assessment protocol for practical application for dogs that remain in shelters for long periods of time, through the direct observation of the animal's responses to its environment, and following the three criteria of reliability, validity and feasibility. Measurements are based on four welfare principles*: good feeding, good housing, good health* and *good behaviour*; and to each principle, several criteria are associated. Finally, each criterion corresponds to one or two welfare measures, ranging from body condition to emotional state. However, this tool still lacks a standardized scoring system, in order to ease the interpretation of the outcomes (Barnard et al., 2015) . Other authors aimed to develop and validate a QoL assessment tool for kennelled dogs. They used behavioural (positive and negative emotions), and physical measures to create a score. It showed to have good validity, but that improvements should be made on the reliability of the score. (Kiddie & Collins, 2014).

1.6.3. Available resources for shelter animal welfare assessment

Even though they are not assessment tools, several resources are available to help shelters achieve good welfare standards. One important document is the *Guidelines for Standards of Care in Animal Shelters*, by the ASV, which created a Task Force to review and research the available studies and publications on the different subjects concerning shelter medicine. The aim of this document is to help organizations to identify minimum standards of care (Newbury et al., 2010). Other resources include the RSPCA's "*The welfare of seized dogs in kennels : a guide to good practice"* written in accordance to the Animal Act 2006 and the five freedoms (RSPCA, 2014b); and the International Society of feline Medicine (ISFM) *Guidelines on Population Management and Welfare of Unowned Domestic Cats* (Sparkes et al., 2013).

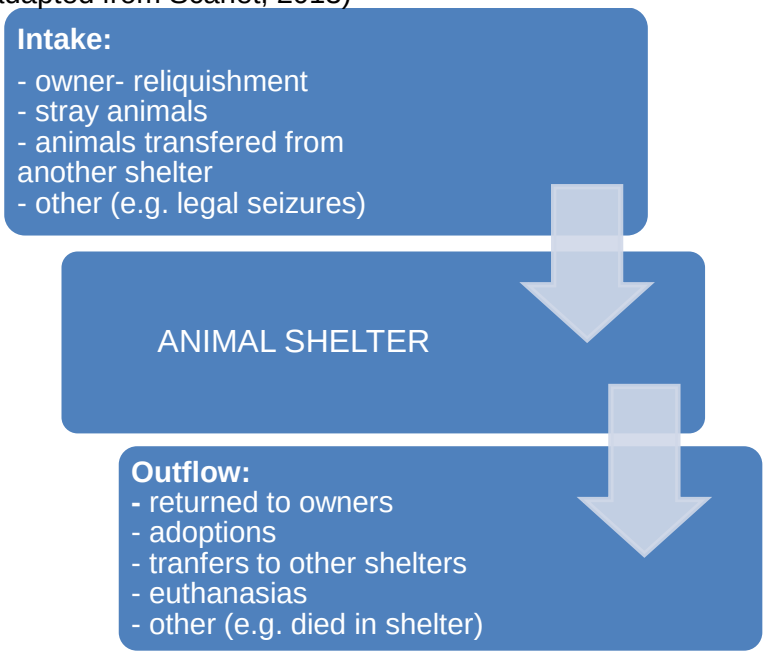
2. Animal sheltering principles

2.1. Population management and policies

With the exception of sanctuaries, shelters aim to be temporary holding facilities, where strategies are implemented to move animals through the system (Figure 3). One of the most important tools for a shelter is an active population management program (Newbury & Hurley, 2013).

There are two main sources of shelter animals: those relinquished by the owners, and stray/lost/free-roaming ones (Marsh, 2010) Efforts to reduce the numbers of animal intake should rely on: reducing the number of owner relinquishments, reducing populations through spay/neuter programs; implementing animal identification (so they can be more easily returned to the owners) and promoting responsible pet ownership. Shelters should seek to save as many lives as possible, and the most usual ways animals leave shelters alive are through adoption, returning to owners, and being transferred to other shelters (for example from municipal to private ones or rescue groups). One way of measuring the achievement of shelters is through the live release rate (LRR) that determines the proportion of live animals that are released in a given period among those that, during the same period entered the shelter (Scarlett, 2013). Figure 3 illustrates the general intake and outflow in animal shelters

Figure 3. General intake and outflow in animal shelters (adapted from Scarlet, 2013)



2.1.1. Capacity for care

Capacity for care can be defined as how well a shelter is able to meet the needs of every animal taken in. In order to achieve it, it is not only important to assure adequate space, but also to guarantee that all five freedoms of welfare are met, through the implementation of diverse shelter programs. Two essential factors in assuring capacity for care include providing good housing and reducing the length of stay (LOS) through pro-active management (UC Davis, 2016).

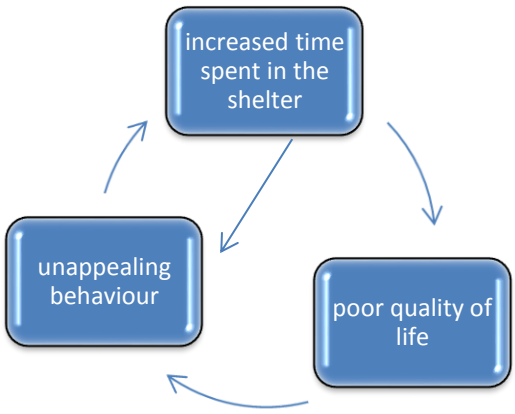
This concept of capacity for care requires a multifactorial approach, and it is crucial to maximize the LRR, maintain animal health, and provide humane care (L. Miller & Zawistowski, 2013). The ASV guidelines considers that " *The capacity to provide humane care depends on the number and condition of animals admitted and their duration of stay, the size and condition of the facility; staffing levels and training; and other factors as well as the number of available enclosures*". The guidelines also consider that operating beyond an organization´s capacity for care is an unacceptable practice (Newbury et al., 2010).

Calculating a shelter´s capacity for care might be complex, but there are several basic capacity calculations that can be used according to the available data. These include: physical holding capacity (quarantine, adoption floor and others); adoption driven capacity (number of animals actively available for adoption); staff capacity for daily care (number of animals that can be adequately cared for on a daily basis) and flow-through (UC Davis, 2015a).

2.1.2. Length of Stay (LOS)

UC Davis refers that LOS is becoming recognized as a critical point in shelter management. It has implications on shelter costs, animal health and welfare, and studies have identified LOS as the most significant risk factor for disease in USA shelters (Dinnage, Scarlett, & Richards, 2009; Edinboro, Ward, & Glickman, 2004). Longer time equal greater needs of physical space, interaction and environmental enrichment, in order to prevent stress and behavioural problems related to confinement. It also facilitates crowded shelters and reduced capacity for care for each animal, ultimately leading to higher economical costs. Conversely, shortening the LOS allows shelter to reduce costs, and lower the risk of development of behavioural and health issues for each animal (UC Davis, 2015). Figure 4 illustrates the downward spiral of LOS.

Figure 4. Downward spiral of LOS in shelter dogs quality of life
(adapted from McMillan, 2013)



It is suggested that LOS could be split into different components, to which diverse programs can be associated to cope with them, namely (UC Davis 2015):

- **Pre-intake LOS**, where appointments are made for admission of found animals or owner relinquishments, depending on the shelter´s capacity. These managed intake programs ca be used in combination with programs that prepare the animal for adoption (e.g. vaccination, de-worming, spay/neuter and behaviour evaluation) before they enter the shelter. Other options include requiring the help of foster families, and giving advice on alternatives for pet relinquishment (Animal Humane Society, n.d.);

- **Pre-adoption LOS,** that usually consists of stray holding periods (7 and 8 days in the UK and in Portugal respectively) or intake quarantine. This LOS should be minimized whenever possible. Prolonged quarantines carry risks, which most of the time outweighs the benefits, so animals should be kept in quarantine for the shortest period of time that allows the majority of infectious disease to be diagnosed. Scarlet (2013), explains that this *communicable period*, is the time in which infected animals can shed the agent, and therefore, transmit it to other animals. It is less than 10-14 days for the most frequent infectious diseases that are of major concern in a shelter environment (L. Miller & Zawistowski, 2013).

- **Adoption LOS,** consist on determining the amount of animals to have for adoption, as in overall, the more animals available for adoption, the longer the LOS will be. Identifying “fast Track” (such as young, purebreds, friendly or healthy animals) “versus” “low Track animals” (such as older, mixed breed or less social animals) is also a good way to improve the adoption outflow. By allowing these “fast track” animals to move quickly through the system, it is possible to save resources for the “low track animals”. Daily population wellness rounds are extremely important to reduce the LOS.

Associated to the concept of LOS, are the concepts of “long-term” and “short-term” stay concept. While it is difficult to define when an animal shifts from short to long stay, but

recommendations for long-term care begin when it is anticipated that the stay will exceed two weeks (Newbury et al., 2010)

2.1.3. Intake and Pathway Planning

The intake process is an important critical point in shelter management. Procedures at intake will help to identify and prevent problems, namely: obtaining information that will help to optimize the LOS; ensuring that each animal receives prompt care, and limit the exposure of susceptible animals to sick animals. Important features on the intake process include (UC Davis, 2015f):

- **Intake capacity planning**: by estimating how many animals are expected to arrive daily, shelters can optimize their intake resources on staff and time. Comparing daily or monthly intake to the respective outcomes is also very useful for population management.

- **Intake staff**: it is very important that staff is properly trained on medical and behavioural evaluation, infectious disease transmission and control and on data collection.

- **Intake area**: ideally, these areas should be used exclusively for intake animals only. It should be a quiet place, easy to clean and should be divided by species. Disinfection should occur daily and always between different animals.

- **Intake procedure** should include: collecting the animal´s history; microchip scanning; age estimating and sex determination; weighing of the animal; physical exam and very brief behavioural evaluation with respective data collection; vaccination with core vaccines; internal and external parasite control administration; prompt communication with the medical team for injured and sick animals; animal information recording on an information system or paper records (Hurley, 2005; Newbury et al., 2010).

The pathway planning is another important component of the intake process. After evaluating the animal, different paths and housing may be chosen, depending on the animal´s characteristics, e.g. differentiating young animals, sick/injured animals; strays within the holding period; “fast track” animals, candidates for euthanasia, feral animals.

Finding alternatives for intake may result on improved outcomes for those animals. Trap-Neuter-Return (TNR) programs are good examples on how to reduce intake. These programs focus mainly on cats, which are spayed/neutered, ear tipped, in some cases vaccinated and returned to their environment, helping to reduce shelter intake as well as euthanasia as a population control measure (Levy, Isaza, & Scott, 2014; L. Miller & Zawistowski, 2013).

2.1.4. Daily shelter rounds

Daily shelter rounds are an extremely important tool to support animal welfare and pathway planning. They consist on a systematic monitoring process that quickly identifies welfare and health problems (L. Miller & Zawistowski, 2013).

These rounds aim to guarantee that everyday each animal receives the care it needs in order to have the best possible outcome. They are different from daily monitoring, as they include both medical and behavioural records, as well as logistical needs. Daily rounds may have a great impact in reducing LOS, and because problems are identified and swiftly addressed, they also help to reduce shelter overcrowding and improving animal care and welfare. Some examples of the steps that may be taken care in the rounds for each individual animal include: existence of an accurate description and photograph of the animal; vaccination, internal and external parasite control; behavioural and/or medical care if needed; spay/ neuter surgery decisions; movement from different areas and euthanasia decisions.

Rounds should take place as early in the day as possible, and it is advisable to perform a more detailed evaluation of each animal every two weeks (UC Davis, 2015b).

2.1.5. Adoption

There are many factors that influence the adoption of animals, and preferences may vary greatly. These include behaviour, temperament, appearance (like for example coat colour), breed, age and size. Knowing the preferences in any given community may be extremely beneficial, allowing for strategic advertising of the animals for adoption (Lepper, Kass, & Hart, 2002; Siettou, Fraser, & Fraser, 2014; Weiss, Miller, Mohan-Gibbons, & Vela, 2012).

There are several strategies for shelters that may help influence adoption. For cats, these include providing toys in the primary enclosure, displaying the animals at the public´s eye level and low stress cat handling (Fantuzzi, Miller, & Weiss, 2010; Gourkow & Fraser, 2006). For dogs, providing toys, social stimulation, training and placement of beds at the front of the pens are helpful strategies (Luescher & Tyson Medlock, 2009; Wells & Hepper, 2000a). Approaches that may improve adoption outcomes are being explored. Online advertising may become a very important tool, and following certain rules for the the animal´s photographs may positively impact the speed of adoption (Lampe & Witte, 2015; Persch, J. A., 2011). The “ASPCAPro” developed a program called Meet your Match™, for dogs and cats, to help increase adoptions and lower return rates. This program assesses the animal’s behaviour and personality, in order to help the adopters meet their expectations.

2.2. Shelter design and environment

Shelter design must consider the health and welfare of animals, as well as its own sustainability (Schlaffer & Bonacci, 2013). In order to ensure physical and psychological welfare, the facilities should be appropriate for the species housed, the number of animals and the expected LOS (Newbury et al., 2010).

2.2.1. Shelter Areas

In order to reduce stress and disease transmission, it is critical to separate animals in certain ways: cats from dogs; healthy animals from infected; seriously ill animals from others until full recovery; newly arrived from adoptable animals; nursing mothers and respective offspring from other animals. The concept of separation and isolation is critical in a shelter setting, requiring an evaluation at intake area in order to triage all incoming animals. There is no need for a lot of space in this holding area, as animals should be moved promptly to permanent housing, which can be any of the following: healthy hold, where all animals classified as healthy on the intake exam should stay, with the exception of legal holds in byte cases; quarantine, for bite cases/ mandatory holding period in rabies suspicion; isolation area (figure 5), for animals that arrive sick/ infectious or become sick/infectious at the shelter, and finally the adoption area, to which the public has access (The Human Society of The United States, 2010). Other areas may be included, such as veterinary units for treatments, recovery and surgeries; training/exercise areas; administration, including lobby, reception and offices; and storage for food and other supplies (Schlaffer & Bonacci, 2013).

Figure 5. Cat´s isolation block at The Stubbington Ark (original)

2.2.2. The shelter environment

There are several components in a shelter environment, identified as critical for maintaining animal health and general well-being. These include space, light, sound, ventilation, drainage and surfaces. Thorough information on each specific component may be obtained through the ASV Guidelines (Newbury et al., 2010), and the “Decreto-Lei 260/2012”, in Portugal. This information regulates the housing norms concerning the official centres and private shelters, among other resources (The Human Society of The United States, 2010).

2.2.3. Primary enclosure

This is the area where, in most shelters, animals sleep, eat, and spend the majority of their time. Enclosures should provide enough space so the animal can easily stand, turn, move its head, lie comfortably, and be able to feed, drink, urinate and defecate (Newbury et al., 2010). For dogs and cats, double-sided or compartmentalized enclosures (figures 6 and 7), allow for safe care, cleaning and sanitation without removing the animal from the enclosure, which is essential to prevent disease transmission, and also allows for the physical separation of functional areas, such as sleeping/feeding areas from elimination areas as most animals will prefer to eliminate away from where they sleep and eat if given the choice (UC Davis 2015i, Wagner, Newbury, Kass, & Hurley, 2014).

Figure 6. Double sided dog primary enclosure. Note the guillotine separating functional areas

Figure 7. Double sided primary enclosure for cats. Indoor side (left), and on the right, the outdoor side (right) (original)

2.2.3.1. Types of Housing

Shelters may choose to house their animals individually, in pairs/groups, or a combination of both types within the same shelter. Individual housing is appropriate for newly admitted animals, litters, those which require special monitoring for medical or behaviour reasons, or those that for some reason are not properly socialized with other animals. Conversely, group housing allows animals to have more social contact and more opportunities for enrichment. However, for some, this causes a perpetual state of stress. These animals may have increased risk of infectious disease and of fighting, and performing health individual monitoring is a challenge (Miller & Zawistowski, 2015).

2.2.3.1.1. Considerations for dogs

There are four main types of housing for dogs: i) small, single cages, appropriate for ill/injured animals who need close monitoring; ii) single enriched cages or condos (figure 8), useful for dogs who cannot not be housed with other dogs; iii) double sided compartment, which may be used for single, paired or group housing; iv) indoor/outdoor runs, similar to the previous type, but one of the sides is located outdoor.

Group housing for dogs (figure 9) provides diverse opportunities for environmental enrichment, including social one, which is so important for this species. However, careful planning should be made in order to ensure the benefits can be achieved without increasing the risk of fighting and disease transmission, as group housing is not appropriate for all animals. Examples of what can be done in order to decrease the risks include: vaccination and parasite control of all dogs, behavioural evaluation to ensure compatibilities between them, and spaying/neutering before placement with others (Miller & Zawistowski, 2015).

Figure 8. Single, enriched condos for dogs. UK (original)

Figure 9. Group housing for dogs, Portugal (original)

2.2.3.1.2. Considerations for cats

Cat housing also includes single housed cages, cat condos, double sided compartments, which are often divided by cat-flaps and with one outdoor side (figure10), and group rooms for group-housing (figure 11).

Like mentioned before, group housing has several risks, and one important fact to take into account when deciding between single versus group-housing is the length of stay. High-turnover may be a high stressor element, so group housing should be reserved for identified long term-stay animals, while single housing could be reserved for animals that usually stay short- term, such as kittens (and respective litter when applicable) or juvenile animals. Single housing should also be available for those cats that for medical or behaviour reasons, cannot be placed with others. Special considerations for group-housing for cats include: provision of sufficient space (recommended floor space per cat is 1.8m^2, and cats should be able to maintain a distance of 1-3m from other cats); groups should be small, ideally 2-4 animals per group, and at a maximum 10-12 cats per group; provision of enough resources for all animals, including food, water, litter boxes, resting areas, toys and hiding places (Newbery, 2015).

Figure 10. Single housing with double compartments for cats, UK (original)

Figure 11. Group housing for cats, Portugal (original)

2.2.4. Environmental Enrichment

Environmental enrichment generally consists in allowing captive animals to improve their physical, behavioural and psychological health, through modifications to their housing environment (Young, R.J., 2003). The ASV guidelines indicate enrichment should assume the same importance as other components, such as nutrition and veterinary care in shelter management and should not be considered optional or accessory care. Enrichment allows for stress-reduction, promotes physical and mental stimulation, encourages species typical behaviours and allows animals to have more control over their environment, contributing to overall welfare (Newbury et al., 2010).

Environmental enrichment can fall into two main categories: animate (contact with other animals and humans); and inanimate (housing, feeding, toys and sensory enrichment) (Wells, 2004a). For the purpose of this chapter, it is important to emphasize the importance of perches, platforms, retreat areas, places to hide, soft bedding and scratching posts for cats. Out of cage time is also very important for both species.

For dogs, outdoor exercise areas promote behavioural, psychological and physical benefits. For cats which do not live in enclosures with enough space to jump, climb, run, make human interactions (such as lap-sitting) and predatory-play behaviour, among others, it is advisable to provide opportunities for out of cage time, especially for “long-term “ stay animals. While unfortunately not all shelters can provide this, an easily cleaned room or large pen may serve this purpose. Concerns about exposure to infectious disease may arise, and high standards of biosecurity and good prevention and control of infectious disease will permit behavioural and health benefits, that in most cases outweigh the risks (Newbury, 2015). Figure 12 illustrates environmental enrichment for cats, and figures 13 and 14, for dogs.

Figure 12. In-cage enrichment for cats, with elevated places to perch (original)

Figure 13. Furniture (indoor and outdoor) for dogs, UK (original)

Figure 14. Exercise areas for dogs, UK (original)

2.3. Shelter Sanitation

Sanitation is the process of cleaning and disinfection, and plays a major role in animal shelters, which are often overcrowded and stressful locations (Steneroden, 2013). Moreover, a large number of sources may promote the introduction of infectious agents, including incoming animals, inanimate objects (fomites) such as carriers, leashes, beds, blankets, and people (Dvorak & Petersen, 2009). Fomites are the most common method of disease spread in shelters. While it is important to know which species may be susceptible to any given pathogen, it is critical to know disease virulent products (e.g. urine or faeces), and train staff and volunteers on the role they may play as fomites, through their clothes, hands and equipment. Staff will be more prone to comply to a sanitation plan if they understand the consequences of disregarding the protocols, on both human and animal health (Miller & Hurley, 2009).

A clean environment will mitigate disease spread. One of the big challenges in animal shelters is the fact that many of the animals which are taken in have no vaccination history, may be in a poor health, malnourished and in stress, and might be already shedding some pathogen, even in the absence of clinical signs. Therefore, a well thought sanitation plan contributes to reduce the exposition to certain pathogens (UC Davis, 2015f).

2.3.1. The sanitation process

The sanitation process consists of three fundamental steps: i) The mechanical removal of visible organic matter. It is considered the first and most important step, as most detergents and disinfectants are completely or partially inactivated by organic matter; ii) A cleaning process, with soap or detergent in warm-to-hot water, and posterior rinsing with water; iii) Disinfection. Disinfectants should be applied in clean surfaces, in appropriate concentrations, and the contact time recommended by the manufacturer should be strictly followed.

Going into details on sanitation protocols is beyond the scope of this study. There are, however, some principles that should be enunciated:

- ✓ A written sanitation plan will help staff and volunteers to keep in mind when, what and how to clean and disinfect.
- ✓ The order of cleaning is extremely important. As a general rule, cleaning should start in shelter areas housing the most vulnerable to infection, but unlikely to be infected, to those most likely to be infected or even shedding infectious agents. Thus, the recommended order is: i) healthy kittens and puppies; ii) healthy adult animals; iii) healthy animals in quarantine/intake; iv) sick animals in isolation.
- ✓ Cleaning can be disruptive and stressful, and stress should be minimized as much as possible. The use of two compartment enclosures is a good way of cleaning without removing the animals from the enclosure, which helps decrease the chances of disease spreading. Another option includes "spot cleaning", which consists of a more superficial cleaning of the primary enclosure, with reduced handling, and it is only appropriate for healthy animals (Steneroden, 2013).

2.3.2. Disinfectants

The choice of the product will largely depend on the shelter, the infectious diseases scenario, and the available financial resources, always taking in consideration its safety for people and animals. A single product may not be enough to handle all the sanitation needs of a shelter. For example, while quaternary ammonium may be good as cleaner and disinfecting agent, it is not very effective against nonenveloped virus, such as calicivirus and parvovirus, which are of great concern for many shelters (Eterpi, McDonnell, & Thomas, 2009). The effectiveness against microorganisms will vary between products and product concentration, and they should never be mixed unless specifically approved by the manufacturer (UC Davis, 2015f). Some details of the most commonly used disinfectants are summarized on Table 3.

Table 3. Most common disinfectants in the shelter (adapted from Dvorak & Peterson 2009; Steneroden, 2013)

	Sodium Hypochlorite (bleach)	Quaternary Ammonium Compounds	Potassium Peroxymonosulfate (e.g. Virkon®)	Accelerated Hydrogen Peroxide (Rescue™)
Bacteria	+	+	+	+
Enveloped virus	+	±	+	+
Nonenveloped virus	+	-	+	+
Fungi	+	±	±	+
Efficacy with organic matter	Rapidly reduced	Reduced	Effective	Relatively effective
Efficacy with soap/detergents	Reduced	Reduced	?	?
Observations	Very effective when mixed and applied correctly; inexpensive	Have detergent activity	Have some detergent activity; Less corrosive to metal than bleach	Short time of contact needed (5 minutes) if in the right dilution

Legend: **+** Effective; **±** Variable; Ineffective; **?** Unknown

3. Medical Health

The medical care in shelters has greatly evolved in the recent years. While the focus used to be on individual health care, spaying/neutering, and euthanasia, nowadays, shelter medicine is practised as a variation of “herd medicine”, without overlooking the individual. Infectious disease control assumes an important role in the medical aspects of shelter medicine. This complex task involves not only vaccination, parasite control and nutrition, but also husbandry aspects, such as shelter design and environment, sanitation and population management (UC Davis, 2010b).

There is no single medical health protocol that suits every shelter, as each will have its own needs and characteristics. However, the following components are fundamental: physical exam on intake; vaccinations on admission; external and internal parasite control; good foster care programs for animals with special needs; daily rounds: disease testing: isolation or removal of sick animals from the general population; quick treatment to alleviate pain and suffering; humane euthanasia when necessary (Hurley & Miller, 2009).

A functional medical health program, from intake throughout the animal´s stay, will allow the shelter to maintain its animals in a good health balance. The program should include veterinary supervision, where evaluation, preventive care (vaccination and parasite treatment included),

diagnosis and treatment are provided by trained staff. Standard Operation Procedures (SOPs) are the best way to ensure that health care practices are maintained within acceptable standards (Newbury et al., 2010).

3.1. Physical exam on intake

Though ideally performed by a veterinarian, staff can be trained to perform simple physical exams on intake. This first physical exam will allow recognizing important disease conditions, including infectious disease signs, and conditions that may require immediate veterinary intervention, such as wounds or signs of pain. Reporting the exam findings on a form will make the information available to everybody, so documentation is very important. The physical exam should include: identification (microchip verified with an universal scanner); patient characteristics (species, breed, sex, hair coat, colour, neuter status, age, weight); overall appearance, attitude and movement; body condition score; hydration; skin condition (alopecia, parasites, other lesions); heart and pulse; lungs; ears, eyes, nose and mouth (teeth and gums) exam; lymph nodes; abdominal palpation; observation of urogenital, musculoskeletal and neurological systems; brief behaviour assessment (ASPCA, n.d.-a; DiGangi, 2011; UC Davis, 2010a).

3.1.1. Clinical Signs suggestive of infectious disease

There are several clinical signs that may indicate the presence of an infectious disease in a recently admitted animal. Though not specific, the observation of this signs may indicate the need for diagnostic tests. Table 4 summarizes the most frequent clinical signs of concern on shelter medicine. Immediate isolation of suspected and sick animals is essential for an effective disease control (Hurley, 2009).

3.1.2. Signs of conditions warranting immediate veterinary assistance

Shelter staff should be trained to identify conditions warranting immediate veterinary assistance and pain assessment. Shelters are advised to have an emergency medical plan, which should include a list of common conditions that are considered as medical emergencies, as well as a protocol on how to contact a veterinarian if there is none on site (L. Miller & Zawistowski, 2013).

The list of common conditions should include: dyspnoea; active haemorrhage; seizures and or/syncope; severe lethargy; non-responding animal (for e.g. shock); evidence of pain; neurologic signs (ataxia, circling, pupils of different sizes) (UC Davis, 2015h); stranguria/dysuria; pregnant females with dystocia; severe dehydration, severe emaciation; major wounds; severe lameness; exposed fractures (ASPCA, n.d.-a).

Table 4. Clinical signs suggestive of disease, (adapted from ASPCA Professional, n.d.a , Miller & Hurley, 2009)

Digestive Tract and Abdomen	**Eyes, Nose, Ears, Mouth and Throat**
Vomiting; Diarrhoea, especially with blood; Distended abdomen; Innapetence	Discharge from eyes or nose; Conjunctivitis; Coughing and/or sneezing and/or excessive salivation; Ulcers in the mouth (tongue/gum) or on the nose; Pale or jaundiced gums or conjunctiva; Enlarged lymph nodes
Nervous System	**Other signs**
Depression; Seizure; Paralysis; Ataxia; Nystagmus; Myoclonus; Chewing movements	Patchy or circular alopecia and scabbing; Pain; Hypothermia; Hyperthermia

3.1.3. Daily observations and monitoring

Daily observations are an important tool to identify health and behaviour changes, allowing staff to act promptly, thus helping prevent serious problems. It is advisable to monitor before cleaning, by early morning. Staff should be properly trained to identify basic health changes, such as the consistence of stool, outputs of urine, changes in attitude, presence of vomit and register appetite and food intake while feeding animals. Tough it is time consuming, it may save time, as problems will be earlier recognized, allowing for their quickly address (UC Davis, 2015c).

3.2. Infectious disease

Spindel (2013) describes three aims that all infectious disease control programs should include: *i) to minimize any factors that may increase host susceptibility* – it should be assumed that all animals entering a shelter are vulnerable to infectious disease, as a significant proportion of animals do not have protective antibody titers for common infectious disease (Lechner et al., 2010). Susceptibility to disease may be enhanced by chronic or painful medical conditions, imbalanced or poor diets, stress, overcrowding, and several specific situations where vulnerability may be increased, such is the case of paediatric and pregnant animals. Therefore, proper management of medical, nutritional, behavioural and environmental enrichment needs are fundamental to decrease host susceptibility; *ii) to improve the shelter animal´s capacity to disease resistance* – by investing on preventive measures, namely vaccination and parasite control on intake. Preventing diseases is more cost efficient than treatment, and should be a priority; *iii) to decrease exposure to pathogens in the shelter* – which includes good facility design, that should allow animal segregation, proper sanitation plans, monitoring and isolation of ill animals, as well as the use of personal protective equipment (Spindel, 2013).

3.2.1. Most common infectious disease in the shelter

There are many infectious diseases commonly diagnosed in shelters, though prevalence may vary depending on shelter and country. The following list does not intend to be exhaustive, as that would go beyond the scope of this work (table 5). For more detailed information, please refer to Annexes 1 and 2

Table 5. **Common shelter infectious and parasitological disease and respective etiologic agents (adapted from European Scientific Counsel Companion Animal Parasites, 2012; Miller & Hurley, 2009; Gingrich & Lappin, 2013)**

Respiratory disease	Gastrointestinal disease	Dermatological disease	Other disease
Canine Kennel Cough Complex **-**Canine adenovirus-2 (CAV-2) -Canine parainfluenza virus (CPiV) -Canine respiratory coronavirus (CRCoV) -Canine herpesvirus (CHV) -Canine distemper virus (CDV) -Canine influenza virus CIV b *-Bordetella bronchiseptica* *-Mycoplasma cynos* *-Streptococcus equi* subsp. *Zooepidemicus* **Feline Upper Respiratory Infection (URI)** **-** Feline hespervirus-1 (FHV-1) - Feline calicivirus (FCV) *-Bordetella bronchiseptica* *-Chlamydophila felis* *-Mycoplasma spp*	**Canine Distemper** -Canine distemper virus (CDV) **Canine Parvoviral Enteritis** -Canine parvovirus (CPV-2) **Feline Panleukopenia** -Feline panleukopenia Virus (FPV) **Other virus associated with enteritis** **-**Canine coronavirus (CCV) **-**Feline coronavirus (FCoV) **Protozoal Parasites** **-***Cryptosporidium spp* *-Giardia spp* *-Isospora spp* *-Toxoplasma gondii* **(Z)** **Nematodes** **-***Toxocara canis* **(Z)** **-***Toxocara Felis***(Z)** **-***Toxascaris leonina* *-Ancylostoma caninum* *-Trichuris Vulpi* **Cestodes** *-Dipylidium caninum,* *- Echinococcus multilocularis***(Z)** *- Echinococcus granulosus* **(Z)**	**Dermatophytosis (ringworm) (Z)** **-***Microsporum canis* *-Microscporum gypseum* **External Parasites** **Sarcoptic Mange (Z)** **-***Sarcoptes scabei* **Demodectic Mange (demodex)(Z)** *-Demodex canis* *-Demodex cati* **Fleas** **-***Ctenocephalides felis* *-Ctenocephalides canis* **Ticks** *-Ixodes spp.* *-Rhipicephalus sanguineus* *-Dermacentor spp.*	**Leptospirosis (Z)** **-***Leptospira spp***.** **Feline Infectious Peritonitis** -Feline coronavirus (FCoV) **Retroviruses** -Feline Immunodeficiency Virus (FIV) -Feline Leukemia Virus (FeLV) **Vector-borne Diseases** *-Leishmania infantum* **(Z)** *- Dirofilaria immitis* *-Ehrlichia canis* *-Babesia spp.* *-Ricketsia spp* *-Anaplasma spp.* *-Mycoplasma haemofelis*

Legend: **Z**-Zoonosis

3.2.2. Vaccination at the shelter

Vaccination is a fundamental prevention component of a shelter medical program, and an effective vaccination program, combined with husbandry practices that aim to reduce stress and risk of exposure to pathogens, will enhance the health of individual animals, or in some cases, reduce the severity of clinical signs.
Shelter populations have characteristically high turnover rates, where vaccination and health histories are seldom available, and the risk levels of infectious disease are high. This brought the need to develop guidelines for vaccination in shelters (Welborn et al., 2011).

In most cases, it is not possible to know the immune status of an animal. Larson et al (2009) describes the immune status of an animal entering the shelter as following: i) immunologically naïve and susceptible to infection and development of disease if exposed to pathogens; ii) already immune as a result of natural immunization (e.g., recovery from infection or disease) or previous vaccination; iii) already infected, either showing clinical signs or possibly incubating disease and/or shedding the infectious organisms to other susceptible animals. The authors also describe that a great number of animals which enter shelters in the USA are immunological naïve to diseases preventable by vaccination. Serological surveys in dogs showed that approximately 50 ± 20% did not have antibody titers for Canine Distemper Virus (CDV), and about 30 ± 15% did not have antibody titers for Canine Parvovirus (CPV-2). 50% of cats did not have antibody titers for Feline Parvovirus (FPV). Conversely, over 75% of the cats had antibodies to Feline Calicivirus (FCV) and Feline Herpervirus (FHV-1), probably most as a result of natural infection (Larson, Newbury & Schultz, 2009). Other studies in the USA reached similar conclusions, although differences in proportions of animals with positive antibody titers for CPV and CDV were found (Lechner et al., 2010; Litster, Nichols, & Volpe, 2012). This information supports the current guidelines advice on the need to vaccinate animals immediately or prior to intake (Day, R. A. Squires, Horzinek, & R. D. Schultz, 2016; Scherk et al., 2013; Welborn et al., 2011).
The use of Modified Live Vaccines (MLV) is preferable whenever available, as they provide rapid immunity against CDV, CPV - 2, and FPV with a single dose in the absence of Maternally Derived Antibodies (MDA) (Larson et al, 2009).

The guidelines define the core vaccines that all animals should receive on intake, including pregnant and mildly sick and injured animals (Welborn et al., 2011). For dogs, core vaccines include CDV, Canine Adenovirus (CAV-2), CPV-2, CPIV, and *Bordetella bronchiseptica.* Defining rabies as a core vaccine depends on the country. For example, in the UK it is considered “non-core”(Veterinary Medicines Directorate, 2014), while in Portugal it is mandatory by law (DL 314/2003). As for leptospirosis, it is not considered a core vaccine. Decision on vaccination should be based on geographic prevalence, and exposure risk of the

individual patient. Adding to this, vaccines against leptospirosis are inactivated, always require two doses at least two weeks apart, which is regarded as impractical and unnecessary in most shelter-housed dogs (Welborn et al., 2011). However, this is a zoonotic disease, and clinical signs of infected animals are often severe. The disease is greatly widespread in Europe, including the UK and Portugal, and it is suggested that the number of dogs that never have access to rodents, wildlife and potentially contaminated water sources or areas is probably very small. Therefore, all dogs considered "at risk" should be vaccinated (Schuller et al., 2015). For cats, core vaccines include FPV, FHV-1 and FCV (Scherk et al., 2013).

Young puppies and kittens deserve special considerations. It is not advisable to vaccinate animals younger than 4 weeks, as their immune system is not mature enough. Conversely, between 4 and 16 weeks, MDA may interfere with the immunological response to vaccines, impairing effective immunization. It is therefore advisable to vaccinate puppies and kittens with core, parenteral MLV, starting at 4-6 weeks of age, every 2-3 weeks, until they are 16 weeks of age, in order to cope with the possible interference of MDA (Larson et al, 2009). A suggested shelter vaccination protocol is available in Annex 3.

3.2.3. Parasite control in the shelter

There are several internal and external parasites of concern for shelter animals. It is not possible to purpose a single protocol for parasite control that will fit all. Internal and external parasites are not uncommon in shelters, and it is possible to find a wide range of species, ranging from species specific to zoonotic, and subclinical to life threatening infections (Miller & Janeczko, 2013).

Animals should receive treatment for parasites on intake and routinely, while they stay at the shelter. It is a challenge to decide upon the periodicity of treatments, though factors like parasite lifecycles, surveillance testing, and economic factors should be taken into account, as well as the parasites most common in the region (Newbury et al., 2010). The European Scientific Counsel Companion Animal Parasites (ESCCAP) produced several guidelines for parasite control in Europe, including endo, ecto parasites, superficial mycosis and vector-borne disease.

Parasitological diagnosis is another important component of parasite control. Diagnostic tests provide shelter specific information, necessary to improve treatment protocols. These tests may also be useful to pinpoint treatment for individual animals. In house tests for internal parasites, such as *Giardia* spp., include faecal flotation with centrifugation and direct faecal smear (UC Davis, 2015d).

3.2.4. Outbreak management

Even with all possible precautions taken, shelters are very vulnerable to outbreaks. This is a multifactorial problem, mainly due to the fact that populations are very diverse, generally with high turnover of animals in various states of health. While no single plan can be applied to all shelters, they all should include: prevention, detection, investigation and response. Since it is not practical to develop a contingency plan for every disease, shelters are advised to develop protocols for diseases more likely to cause outbreaks.

Prevention of outbreaks relies on infectious disease control programs that should be strictly followed in order to decrease the risk of outbreak, which can be aided by prompt recognition of signs of disease, and isolation of suspected animals. Overcrowding is probably the most insidious risk factor for shelter disease outbreak, highlighting the importance of following the premise of the "capacity for care". Detection of outbreaks relies on the skills of training staff to detect early signs, as well as good data collection, which will support disease surveillance. That way, every uncommon clinical signs and sudden deaths should be reported. Conversely, investigation relies on case identification, diagnostic and data collection and analysis.

In order to prevent agent transmission to susceptible animals in both shelter and community, control measures should be promptly implemented. This includes: removing contagious animals from the population, such as isolation within the premises, transfer to a hospital or clinic and foster care; performing a risk and exposure assessment, in order to decide which exposed animals should be quarantined, as this is a process that drains shelter's resources. The decision to quarantine will depend upon the pathogen, environment and host related disease determinant factors. Other control measures include proper cleaning and disinfection, protection of animals and people at risk (particularly important if the outbreak is caused by a zoonosis), as well as those animals who will continue to enter the shelter. Finally, depending on the severity of the outbreak, shelters often have to make difficult decisions, namely the suspension of animal intake and/or animal adoptions. Ringworm and CDV are examples of agents that have been described to cause outbreaks resulting in temporary shelter closure (O' Quin, 2013).

3.3. Spay and neuter programs

The importance of spay (ovariohysterectomy) and neuter (orchiectomy) programs in the reduction of the animal population is nowadays undiscussable. Many organizations have come forward to support the practice of neutering/spaying previous to adoption (AVMA, 2016; Briosa. C & Maia.H, 2010; BSAVA, 2013; RSPCA, 2014a), or for stray animal control (World Organisation for Animal Health [OIE], 2014).

Spay/neuter programs are invaluable when it comes to reducing shelter intake and euthanasia of dogs and cats, this being supported by growing evidence-based data (Marsh, 2010), and over the past decades this practice has become routine among shelter veterinarians (Griffin et al., 2016). Currently a wide range of different programs is available, including: designated stand-alone spay-neuter practices in stationary and mobile clinics; MASH-style (mobile animal surgical hospitals) programs, clinics located within the shelter; community cat programs such as TNR; and voucher systems. Spay and neuter services may also be provided through private practitioners, and integrated into clinical training programs for veterinary students (ASPCA, n.d.-b; Griffin et al., 2016; Makolinski, 2012).

In order to save time, money and other valuable resources, organizations should assess the need for spay/neuter services in the communities they serve. To identify these needs, shelters and rescue groups need to collect and share data, including animal intake, live release, euthanasia and number of spays performed, plus data relating to each animal: species, age, sex, breed, location where the animal lived or was found and intake type. This data helps to evaluate the types of problems in the community and assesses the impact of spay/neuter programs. For example, after assessing their data, some organizations may find that they need to spend more resources on reducing kitten intake, (.i.e. by offering spay/neuter services for felines in a certain area), while others may find the need to focus their resources in providing spay/neuter for low-income households. Another tool that may help organizations to better target resources and intervention locations is through a geographic information systems (GIS), which allows the mapping of the original locations of admitted animals (Makolinski, 2013).

3.3.1. Early neutering

Paediatric, or prepubertal neutering, can be defined as the spaying/neutering of animals younger than 6 months, generally as young as of 6-8 weeks of age, and started to be performed as one of the solutions to decrease animal overpopulation (Appel & Scarlett, 2013). Traditionally, neutering of both dogs and cats has been performed at 6 months old or older, even though there is not much evidence to support this as the optimal age to neuter (Kustritz, 2007).

There are some concerns about the potential risks of early neutering, regarding health and behavioural aspects, even though there is still lack of evidence for many of the hypothetic risks for neutering overall, especially when comparing early neutering with traditional age for neutering (Appel et all, 2013; Kustritz, 2007; Spain, Scarlett, & Houpt, 2004; Spain, Janet M., & Katherine A., 2004).

There are important considerations to keep in mind when performing paediatric anaesthesia and surgery, as described by Joyce and Yates (2011): limited cardiovascular compensation

for changes related to drugs; an immature sympathetic nervous system that restricts the ability to increase heart rate and contractility in response to bradycardia induced by drugs, such as α2 agonists, resulting in a high risk of hypotension; higher tissue oxygen consumption, resulting in higher respiratory rates. Therefore, oxygen should be provided throughout ovariohysterectomy, and it is essential to maintain a patent airway with endotracheal intubation.

Paediatric patients also have a higher risk of hypothermia, due to high body surface area to mass ratio, reduced subcutaneous fat reserves and reduced capacity of thermoregulation, so measures to keep the patient warm are fundamental, including: performing moderate hair clipping and minimal wetting at surgical preparation; using isolating materials and warming devices during surgery and recovery; minimizing anaesthetic and surgical times. Another question to consider is that in patients younger than 8 weeks, hypoalbuminaemia occurs, which potentiates the effects of highly protein-bound drugs such as propofol. Also, until 12 weeks of age, hepatic enzyme systems are immature, resulting in a reduced speed and capacity of drug transformation and metabolism. Drug excretion is also reduced due to immature glomerular filtration and reduced renal blood flow. Therefore, anaesthetic protocols must be chosen carefully. Fasting should not exceed 3-4 hours prior to surgery (2-3 hours if <8 weeks old), and water should not be withdrawn for more than 1 hour before surgery.

As for anaesthesia, there are several safe protocols described in literature. One that has been safely used in early neutering of kittens is the QUAD (medetomidine + ketamine + midazolam + buprenorphine), calculated on the basis of body surface area. The QUAD protocol delivers very good analgesia (6-12 hours postoperatively), quick induction and recovery, good depth of anaesthesia, multimodal analgesia, and the possibility of being reversed with atipamezole (Joyce & Yates, 2011).

4. Behavioural health

Behavioural health and mental well-being are important components of a shelter´s structured health plan, as behaviour healthcare is essential not only to reduce stress and suffering, but also to identify problems that may pose a risk to humans and other animals. The necessary confinement in shelters often leads to the animal not having any type of control over its environment, which is one of the most important stress factors. This situation is aggravated when there are no opportunities for coping, such as hiding and/or mental and physical stimulation. Not only do behaviour problems compromise health and welfare, they also compromise the adoptability of an animal (Griffin, 2009a; Newbury et al., 2010). Behaviour problems that develop due to confinement are not the only concern shelters face. There is evidence that behaviour problems are one of the leading factors for relinquishment to animal

shelters in the first place, to an extent that Overall (2013) states that in developed countries, behavioural problems may be responsible for more relinquishment and euthanasia than infectious disease, neoplasia and cardiac disease combined (Overall, 2013). Nearly 50% of dog owners state behaviour as a contributing factor for relinquishment, and almost 25% of them as the primary reason (Duffy, Kruger, & Serpell, 2014). Behaviour problems were also identified as an important factor in the failure of adoption in the UK (Diesel, Pfeiffer, & Brodbelt, 2008).

Knowledge and skills regarding animal sheltering have been increasing, and behavioural health of shelter cats and dogs is an emerging field of research. Results evidence strong relationship between physical and psychological health, and how by reducing behavioural stress, it is possible to decrease illness and lower euthanasia rates (Weiss et al., 2015).

It goes beyond the scope of this work to describe the repertoire of normal species -specific behaviours for dogs and cats. However, some normal behaviours will be highlighted along the text in order to justify specific behavioural interventions. Ideally, staff should have basic knowledge on cat and dog body language and normal behaviours, and should also be able to identify stress-related behaviours, in order to be able to intervene and improve the animal´s well-being (Newbury et al., 2010).

4.1. The impact of stress on medical and behaviour health

Adverse circumstances activate stress response with consequent release of catecholamines, in order to prepare for a "fight or flight response" (increased heart and respiratory rate, elevated blood pressure, dilated pupils)., but also of cortisol due to the hypothalamic-pituitary-adrenal axis activation. This situation leads to physiological changes in the body, and furthermore, to physical and behavioural signs and abnormalities. One of the potential consequences is the decrease in immunity, particularly worrying in shelter setting, because of the high risk of exposure to infectious disease (Janeczko, 2015). Adding to having a higher probability of becoming ill, stressed animals are also more prone to develop severe clinical signs, remain ill for longer periods, and have a lower response to treatment (Gourkow & Fraser, 2006).

Stress also leads to behavioural changes, which will have a negative impacts on animal welfare, may decrease an animal´s chance of being adopted, and increase the risk of injury for staff, as highly stressed animals may have unexpected reactions (Janeczko, 2015). Several factors contribute to individual responses to stress, such as genetics, past experiences and environment, temperament and learning. However, the most important factor that influences the effect of stress is the individual´s perception of it (Tynes, Sinn & Koch., 2015).

4.1.1. Stress factors and shelter-related behavioural impairments in dogs

Kennel related canine stress has been the subject of much research, and several factors and stress signs have been described. New daily routines, unfamiliar smells, sounds, people and other dogs result in potential stressful experiences. Confinement often results in lack of control of the environment and unpredictability, resulting in fear (short term effect), while prolonged kennelling may prevent dogs from engaging in species- specific behaviours, such as social interaction with people and other dogs, which often results in frustration (long term effect). Some dogs even experience severe distress due to the fact that they are separated from their tutors, and may exhibit separation anxiety disorders (Stephen & Ledger, 2005). Beerda et all (1998, 1999) described behavioral indicators associated with acute stress in dogs, including: low body posture, oral behaviors (such as lip licks), yawning, and increased restlessness (Beerda et al., 1998) and lowered body posture, increased auto-grooming, paw lifting, vocalizing, repetitive behavior, and coprophagy as manifestations of chronic stress (Beerda, Schilder, Van Hooff, De Vries, & Mol, 1999).

Stephen and Ledger (2005) proposed an ethogram of behaviours associated with poor welfare in kenneled dogs, which can be referred to in Annex 4. Results from their survey conducted in the UK, were that excessive vocalization was the most common reported behaviour, besides showing that the percentage of dogs performing behaviors associated with anxiety and fear, such as escape attempts, hiding, lack of appetite and listlessness declined throughout the first 6 weeks of living in kennels. Conversely, the prevalence of behaviors associated with frustration, such as pacing, wall bouncing and bedding chewing, increased when dogs lived in an environment which did not allow them to perform species-specific behaviours (Stephen & Ledger, 2005).

4.1.2. Stress factors and shelter-related behavioural impairments in cats

There are several stress factors within a shelter setting that may contribute to stress in cats, often including: the transport to the shelter; separation from familiar people and animals; lack of control in an unfamiliar environment; altered daily routines; handling and restraint; high density housing; unfamiliar smells and sounds. This often leads to anxiety and fear, and individual responses may vary, but reported behavioural changes include:

- Aggressive and destructive behaviour;
- Hyper-vigilance leading to fatigue, pica (eating inedible things), excessive grooming and vocalising, self-mutilation, and suppression of feeding, elimination, grooming, exploration and play. (Janeczko., 2015)

4.2. Intake Considerations for stress reduction

Behavioural information should be obtained starting at the intake process. Owners (or finders) are an important source of information, and shelters have been developing questionnaires and interviews in order to collect as much information as possible about the individual animals. Surrendering an animal is frequently a very stressful situation, both for the animal and owner, and strategies can be used in order to mitigate this, and at the same time, obtain reliable information, such as: schedule intake appointments whenever possible, which should be conducted in private and quiet places; place the animal in a quiet place; train staff to be understanding and non-judgmental; simple and objective questions in the questionnaires etc. (Marder, 2015).

The questionnaire will allow the shelter to identify some individual needs and potential problems, which may help staff to make decisions concerning pathway planning, housing considerations for that individual or even future adoption considerations. Some shelters even decide whether an animal is adoptable or not based on this questionnaire. Questions to ask concerning dogs include: reasons for surrender; tolerance to humans and other animals; daily routine; personality; fears; behavioural responses to certain situations and degree of training. For cats, questions include: reasons for surrender; daily routine; personality traits; tolerance of humans and other animals; litter box habits (Griffin, 2011).

4.2.1. Strategies to reduce stress on intake

4.2.1.1. Dogs

Entering a shelter is usually a very stressful event for a dog. Whether they were strays, or had previously lived in a home, the animals are confronted with many changes in their daily routine, smells, sounds, and have to face new people and other animals. it is known that psychological stressors activate stress-related responses, and while some animals may become more active, others become inactive. Efforts to reduce stress-inducing stimuli should be based on proper housing and husbandry principles, some of which were explored on chapter 2.2. Strategies include: positive handling (rough handling by staff should be avoided by all means), noise reduction, avoiding random placing with other animals and providing comfort and environmental enrichment in their primary enclosures. (Miller et al., 2015)

4.2.1.2. Cats

For most cats, entering a shelter is also a very stressful event. Capture and transport may already be an uncomfortable experience, and for some animals, even a traumatic one, associated with negative emotions. Adding to the fact that cats have heightened senses of hearing, smelling and vision, being placed in an unfamiliar place with corresponding smells,

sounds and sights will increase stress. The unfamiliar and overstimulating environment frequently results in fearful responses by the cat, often mistaken as aggression. Negative experiences may prevent a successful adaptation to the shelter, increasing anxiety and mental suffering.

Efforts to minimize stress should begin as early as the waiting/reception area. The first impression is extremely important, so the area should be as quiet as possible, away from dogs, and as cats feel more secure when perched on high points, carriers should be placed on elevated shelves, and covered by a towel.

Other efforts to minimize intake stress include: gentle and skilled handling during the physical intake examination; providing hiding areas in the primary enclosures, which should be double sided whenever possible, in order to facilitate cleaning without inducing stress, besides allowing for separate functional areas. (Janeczko, 2015)

4.3. Behavioural evaluations

4.3.1. Dogs

Behavioural evaluations can be performed for numerous reasons, namely: i) to identify dogs with aggressive behaviour, or other serious behavioural problems. Treatment and management of these issues will depend on shelter´s resources; ii) to improve the process of adoption matching. Evaluations may give a better understanding of the dog's behavioural tendencies and individual needs, which helps adopters to choose the best match for them; iii) to monitor dog welfare in the shelter and stress-indicative behaviours..

There are several different ways of evaluating behaviour in shelters and rescue groups: through evaluation forms made shelter staff with behavioural knowledge; using behavioural history of the animal, often with other sources of behavioural information; by observing and registering the dog´s behavioural in the shelter (e.g., during play groups) or through the responses to a standard group of stimuli of a formal behavioural evaluation. Examples include: Match-Up II[1] (for behavioural screening, adoption matching and behavioral modification); SAFER[2] (aggression screening and behavioural modification); and Canine-ality[3] (for adoption matching). Although standardized evaluations may be useful, they need to be interpreted with care. These evaluations are only snapshots in time, and information obtained through these tests may not be entirely predictable of a dog´s future behaviour, (Marder, 2015).

[1] http://centerforshelterdogs.tufts.edu/csd-research/validated-behavior-assessment/
[2] http://aspcapro.org/safer
[3] http://aspcapro.org/canine-ality

Patronek & Bradley (2016) suggests that instead of performing evaluations that bring out the worst in dogs (due to some of the stimuli present in these evaluations), shelters should focus spending their resources on engaging dogs in interactive and positive activities, such as walks, play groups and socialization with people. It is likely that these activities will permit to identify dogs whose behaviour may be concerning, provide environmental enrichment to the dogs, and will help to identify the dog´s typical behaviour and personality.

4.3.2. Cats

Behavioural evaluations are an important tool for performing a thorough feline behaviour assessment. These will provide indications on how to safely handle the animal; help to identify the most appropriate type of housing; the need for behavioural interventions and additional enrichment, and to improve the process of adoption matching.

Individual information should be obtained from as many sources as possible, namely: history provided by the owner/finder, registered observations during the cat´s stay in the shelter, and observations obtained through structured evaluation procedures.

While behaviour is dependent of the way an individual acts in response to a stimuli, and may change, depending on experiences and learning. Temperament, rather than learned, generally refers to traits that are likely stable and innate to the animal´s nature, being more related to the concept of personality. Many authors object to the term “temperament test”, when assessing behaviour at the shelter, preferring “behavioural evaluation”. However, for cats, the term “feline temperament profile” is often found in literature. One example is the Meet Your Match Feline-ality™[4], developed to assist shelters in adoption matching. Based on test results, cats are assigned to one of nine “feline-alities”, depending on two main categories: social behaviour and response to novel stimuli. However, this test cannot be safely used in all cats. Some take a long time to acclimate to the shelter, and show fearful or aggressive behaviour because they are greatly stressed. Because there is no validated test to distinguish fearful from feral cats, and socialization status cannot always be predicted on intake, each organization should develop policies to decide when and for how long to keep cats in the shelter. Allowing a longer time of stay may allow socialized cats to acclimate and posteriorly get adopted, but decisions must be balanced with the possibility of unnecessarily housing feral cats for a long period of time, which creates welfare concerns for the cat (Janeczko., 2015).

[4] http://www.aspcapro.org/feline-ality

4.4. Strategies to support Behavioural Health in the Shelter

In addition to the stress reduction considerations addressed in the previous chapters, there are several other strategies that help support behavioural health in the shelter, namely: i) proper housing and husbandry practices, including respecting daily routines; ii) environmental and social enrichment; iii) structured training and behavioural modification programs (Griffin, 2011). For the purpose of this work, the focus will be on shelter enrichment strategies.

4.4.1. Enrichment

As mentioned on point 2.2.4 Environmental enrichment can fall into two main categories: animate (contact with other animals and humans); and inanimate (housing, feeding, toys and sensory enrichment) (Wells, 2004a) Terminology may be flexible, as inanimate may also be referred to as “environmental enrichment”, and animate as “social enrichment”. Also, behavioural opportunities resulting from enrichment may be described as “behavioural enrichment” (Weiss et al., 2015).

The aim of providing enrichment is to maintain good physical and psychological health. Starting on intake, and being maintained through the animal’s stay at the shelter, these strategies will help manage stress, provide appropriate stimuli for the species (e.g. mental stimulation through play and training, and physical exercise), prevent boredom and encourage learning, and overall, present the animal with opportunities to exhibit its species typical behaviours. Enrichment also helps prevent, reduce or even eliminate behaviours related to stress, and increase the animal’s capacity to cope with challenging and stressful situations (Moesta et al., 2015)

4.4.1.1. Enrichment for dogs

Some enrichment strategies for dogs are summarized in the following paragraphs. Individual needs should always be taken into consideration, as not all strategies are appropriate for every dog.

4.4.1.1.1. Social enrichment

- **Contact with conspecifics:** it is considerably detrimental housing a highly social species such as the dog, in total isolation from members of its species. It is advisable housing dogs in pairs or groups, and the mere fact of disposing kennels in a way that allows dogs to see their conspecifics may be beneficial. However this is not always possible for all animals, and for some animals it is not advisable (Wells, 2004a). Other strategies to promote social interaction with conspecifics include dog walks and play

groups, such as is the case of the program “Dogs Playing for life ™” (figure 15), which offers guidelines to promote safe group-playing between shelter dogs (Sadler, 2014).

- **Contact with Humans:** this is extremely important and beneficial for most shelter dogs. Strategies include: grooming and handling by staff and volunteers; play between dogs and staff/volunteers; dog walking; training sessions with positive reinforcement methods, and spending quiet time with the dogs (figure 16) (Center for Shelter dogs, n.d.; Wells, 2004a)

Figure 15. **Play groups for dogs. Adapted from Sadler (2014)**

Figure 16. Social enrichment with Humans. Dog walking (left) and quiet time (right) (original)

4.4.1.1.2. Environmental Enrichment

- **Toys:** though not all dogs value the presence of toys, evidence has shown that their mere presence in the primary enclosure is seen by the public (and prospective adopters) as a desirable element, and may increase the chances of adoption. There are plenty of toys available on the market (figure 17), including balls, chew toys, and toys which allow feeding enrichment such as kongs® (figure 18). PVC and cardboard are cheap alternatives for making home-made toys (Moesta et al., 2015).

Figure 17. **Toys as enrichment for dogs (original)**

Figure 18. Kong toy for feeding enrichment. Kong Company (2016) www.kongcompany.com

- **Cage furniture and design:** raised platforms**,** which allows dogs a better surveillance of the environment, besides providing rest places (on or under); places to hide, which allow animals to have some control of the environment; pen design, that should allow

for a separate functional areas (sleeping apart from eliminating) (Moesta et al., 2015; Wells, 2004a).

- **Sensory enrichment :** i) auditory enrichment: there are some studies highlighting the potential benefits of providing classical music (Kogan, Schoenfeld-Tacher, & Simon, 2012) and audiobooks for shelter dogs (Brayley & Montrose, 2016); ii) olfactory enrichment (figure 19) benefits have not yet been well explored. There is a study suggesting some benefits for dog welfare by spraying essential oils in the kennels, such as camomile and lavender. These two essential oils seemed to have a calming and relaxing effect, inducing behaviours desirable to potential adopters (Graham, Wells, & Hepper, 2005). Scent boxes (wooden box with holes, into which scents may be sprayed) are another option which may also be valuable for puppies exploring the sensory world for the first time, and for elderly dogs with age-related sensory loss; iii) the Dog appeasing pheromone (DAP) , which has been advertised for calming properties in dogs, although more research needs to be conducted to reach more conclusions on its benefits for shelter dogs (Moesta et al., 2015).

Figure 19. Olfactory enrichment. Scent box (left), (adapted from Deacon et al 2015) ; and essential oils spray (right) (original)

4.4.1.2. Enrichment for cats

Many of the above mentioned ideas and criteria used for dogs may be applied for cats, namely the reasons for providing enrichment and the need to provide both social and environmental enrichment. Some species-specific types of enrichment include:

4.4.1.2.1. Social enrichment

- **Conspecifics socialization:** cats may benefit from group housing. However, it can be very stressful placing incompatible, undersocialized, or too many animals together. As

mentioned in chapter 2.2.3.1, special housing considerations must be considered to assure welfare for cats in group housing conditions (Weiss et al., 2015).

- **Contact with Humans:** Positive human interaction, e.g. through playing and training.

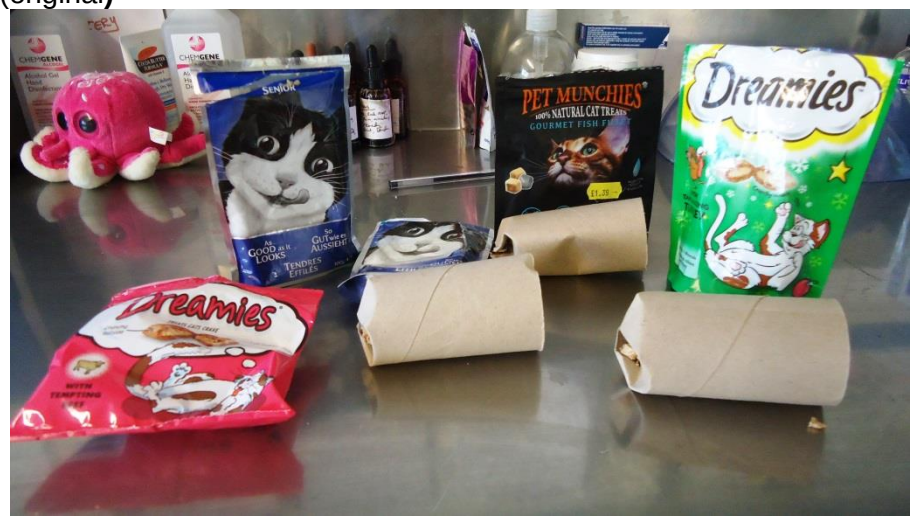
4.4.1.2.2. Environmental Enrichment

- **Cage environmental enrichment:** i) places to hide and retreat, that should be available for all cats. Examples include the use of towels to hide part of the cage, and cardboard boxes (figure 20); ii) elevated areas, such as a sturdy cardboard or plastic boxes, window perches, plastic lawn chairs, shelves on the wall, small tables and raised walkways; iii) soft bedding; iv) scratching pads or posts, as scratching is a natural and necessary behaviour for all cats (Miller & Watts., 2015).

Figure 20. Places to hide. Cardboard box placed inside the enclosure (left) (original). For small enclosures, a towel over an elevated bed can also provide a good place to hide (adapted from UC Davis 2015)

- **Feeding enrichment:** in the wild, felines spend a lot of their time seeking, obtaining, and processing food. They often need to walk long distances, remembering and tracing past food sources, as well as exploring unfamiliar places. On the contrary, confined cats frequently have very few options to occupy themselves, often leading to frustration, lethargy and weight gain. These consequences may be mitigated through this type of enrichment. Food dispensing toys help to mimic the cat's natural feeding strategy (hunt, chase, grab, bat, or pounce) allowing them to obtain small multiple meals. This can be achieved through the use of kongs®, kibble dispensers, or by hiding food inside empty toilet paper rolls (figure 21), cardboard boxes, and empty yogurt containers, just to give some examples (Miller et al., 2015).

Figure 21. Feeding enrichment for cats. Empty paper rolls are easy was to insert and hide food items (original**)**



- **Sensory enrichment:** cats use odour for communication and territory marking, and they probably benefit more from familiar odours than from novel ones. Since cleaning away familiar odours may be stress-inducing, cage “spot cleaning” may be a solution, removing bedding only when necessary. Scents like catnip have been known to catch feline interest, and there are many toys available containing this herb. As for to the Feline Facial Pheromone (FFP), benefits for shelter animals are not very well documented. Moreover, the pheromones’ effects may be surpassed by high levels of other stimulation, and as they are quite costly, their acquisition must be pondered (Miller et al., 2015).

CHAPTER III – THE SURVEY

5. Objectives

The objectives of this study are:

1. To make a condensed state of art review, concerning Shelter Medicine, animal protection and sheltering in the UK and in Portugal, and animal welfare, based upon the latest scientifically based research, offering a structured view of this field of study;

2. To adapt and test a free web-based tool, the UC-Davis Virtual Consultant ™, developed for data collection and shelter survey, to assess a sample of shelters in the UK and mainland Portugal;

3. To identify "*Good practices*", "*Practices To Improve*", and practices considered as *"Risk Alerts"* for behavioural and medical problems, in dog and cat shelters in the UK and mainland Portugal, which was also the main aim of this study.

4. To develop a report template to communicate to shelter's managers the evaluation of their everyday practices, to provide them with practical and targeted solutions regarding critical aspects of animal care, and help them to make positive changes.

6. Materials and methods

6.1. The questionnaire structure

The model for the questionnaire was the UC-Davis Virtual Consultant™, developed by the UC Davis Koret Shelter Medicine Program and the University of Wisconsin, School of Veterinary Medicine Shelter Medicine Program (USA)[5], whose main purpose is to "*improve shelter animal health and increase lifesaving"*. This tool is freely available online (www.sheltermedicine.com), and gives shelters and welfare organizations the opportunity to register. It is composed by several questionnaires, distributed in different themes, including shelter animal health and shelter animal behaviour and enrichment. Registers get immediate feedback to their replies on animal care practices, and a report is produced by the end of each survey. Each reply is evaluated as a "*Good Practice*" (GP) or as a "*Risk Alert*" (RA), and the final report justifies the classification, also providing several resources on the subject of the question, so shelter workers may research more. Thus, many questions used in our questionnaire were adapted from this tool. The evaluating method was also adapted, as each reply was considered as a GP or as a RA, as well as the final report, made for each shelter. One of the differences in this

[5] For the remaining of the study, it will be cited as "Koret Virtual Consultant"

project was that the author felt the need to consider a third classification for some questions, namely a "*To Improve*" (TI) classification. The main reason for this option was that shelters might feel as a positive reinforcement if specific answers were classified as TI, rather than RA.

The pool of questions in the Koret Virtual Consultant (KVC) follow the ASV guidelines, even though some go into more detail of what can be found there. Both the Program Directors of the veterinary schools responsible for the Virtual Consultant (Doctor Kate Hurley from UC Davis and Doctor Sandra Newbery from Wisconsin) are also co-authors in the ASV Guidelines. In addition, some questions were adapted from the "*Shelter Care Checklists: Putting ASV Guidelines into Action*", produced by the ASPCA in 2014.

One of our major challenges was to decide which questions to include. A key decision was to select and adapt questions only concerning Medical and Behavioural Health, as the purpose was to collect detailed data about these issues. When finally concluded, the questionnaire ended up having 78 questions (a copy may be consulted in Annex 5). The "*Medical Health*" topic was sub-divided in: "*General"; "Health Exam"; "Vaccines"; "Parasites*"; "*Monitoring and Response to Disease and Illness"; "Medical Treatment"; "Spaying and Neutering*". The "*Behavioural Health*" topic was sub-divided in "*General"; "Dogs"* and "*Cats*".

The beginning of the questionnaire allows for a small characterization of each shelter, including localization, intake policy, capacity for care, staff information and outcome for the animals.

6.2. Classification of the questionnaire replies

While some where open questions, the majority consisted in multiple answer questions. Each question included at least one reply considered as a GP, and at least one considered as a RA, but some questions had several GP replies.

Considering a reply as a GP means the practice is desirable in accordance either with the KVC or with the ASV Guidelines (most of the situations by both), and is supported by scientific evidence.

Considering a reply as a RA, means the practice might pose a risk to the welfare of animals that live in that shelter or to Public Health. It is an alert that a task should be revised as soon as possible, within the shelter´s possibilities.

Considering a reply as TI means that the shelter has already made some steps towards the GP, yet it has not reached its goal. Shelters which received this classification on any given question should be encouraged to make additional efforts to reach the GP.

6.3. Implementing the survey

The survey was conducted in person by the author, between March 2016 and June 2016, in five shelters in Portugal and four shelters in the UK.

6.4. The shelters

- ***College Garth*** is located in Leicester, UK. They have a protocol with the Local Council, taking in stray dogs, which the only species they care for. The council only subsidizes a dog´s stay for the mandatory seven day holding period, but the shelter keeps the dogs until they are re-homed, returned to the owners or transferred to other shelters. The capacity is for around 44 dogs and employs 6 caregivers. It does not have a veterinary unit nor full time vet, and has a trainer (once a week) and exercise facilities.
- ***Dogs Trust Loughborough***, Leicestershire, UK. It is one of the 21 Dogs Trust Centers, a nationwide private charity dedicated to dog´s re-homing. This center has a capacity for 120 dogs, and is very dedicated to animals with behavioural or training needs. It has full time trainers/behaviourists, training and exercise facilities, a physiotherapy unit, and a veterinary unit with a full time veterinarian and a vet nurse.
- ***The Stubbington Ark*** is located on Hampshire, UK, and is part of the RSPCA Solent Branch. It´s home to many different species, including cats, dogs, small mammals, birds, farm animals and wildlife. It has a capacity for 120 dogs and 80 cats, employing 23 caregivers, 10 office staff and 2 managers. The shelter has a fully equipped veterinary unit, with 2 veterinarians and two vet nurses. The average length of stay is 4 weeks for dogs and 33 days for cats.
- ***Leicester Animal Aid*** is located in Leicestershire, UK. It is a small private shelter housing dogs and cats. They can shelter 50 dogs (8/9 per caregiver) and 19 cats. The average annual intake is around 250 dogs and 180 cats. The shelter has a vet unit, although no full time veterinarian, trainers, behaviourists and exercise facilities, 12 caregivers and 7 office/management employees.
- ***Casa dos Animais de Lisboa*** is located in Lisbon, Portugal. It´s the Council´s Official Capture Centre (CRO), financed by the city council, and lead by a municipal veterinarian. It shelters dogs and cats, and occasionally small mammals and farm animals. Regarding intake policies, the shelter´s priority is stray animals found on the street, and then animals whose owners lose their houses, among other precarious situations, within the municipality of Lisbon. The average capacity is 150-170 dogs and 60 cats (on the adoption floor). It has a team of 6 veterinarians and a veterinary unit. It does not have a trainer nor exercise areas. The remaining team consists of 15 caregivers, 4 operation managers and 5 members of office staff.

- ***Cantinho da Milú*** is located in Setúbal, Portugal. It is a private shelter, that depends largely on donations. It houses only dogs, which live in parks of various sizes. It is mainly a re-homing center, but also functions as a sanctuary for some dogs. The shelter was built for 300 dogs, but nowadays keeps around 650. It has a vet unit, a part time veterinarian, a full time veterinary assistant, 5 caregivers, one office manager, 5 volunteer trainers, an 20 other volunteers. The average length of stay is around one year (excluding sanctuary dogs).
- ***Sintra´s Council CRO*** is located in Sintra, Portugal. It is financed by the city council, and lead by a municipal veterinarian. It houses dogs, cats and farm animals. Their intake priority is stray animals, or those whose owners find themselves in precarious situations. They have an average capacity of 140 dogs and 60 cats, with two full time veterinarians and one veterinary unit, 10 caregivers, one operations manager, 3 office staff and one educational psychologist. They also have a protocol with a behaviourist and trainers.
- ***APAFF -Associação Protectora dos Animais da Figueira da Foz*** is located at Figueira da Foz, Portugal. It is a small private welfare organization, with a shelter for cats and dogs, and a center for spaying and neutering cats through its TNR programs. The animals come mainly from the municipal shelter, and is has a capacity for around 200 animals, with 2 caregivers, and two office staff, all volunteers, with a total number of around 10 volunteers. They have a veterinary unit but no veterinarian, having instead protocols with veterinary hospitals.
- ***APA - Associação de Protecção aos Animais de Torres Vedras*** is located in Torres Vedras, Portugal. It is a small private shelter that houses mainly dogs, and some cats. They have an average capacity for 180 animals, but at the moment of the questionnaire visit they housed around 278. They have 2 caregivers, one operations manager and one office member of staff, and an average of 10 volunteers. They have a veterinary unit but no full time veterinarian, they have protocols with private veterinary clinics. The average length of stay is of two years for dogs and one year for cats.

6.5. Data analysis

The data from all the shelters was collected on a personal interview structured with a 19 pages questionnaire, assembling 78 questions. A database was built on a spreadsheet (Excel ® 2010), were all data was entered, stored, validated, and were descriptive statistical analysis was performed.

For privacy purposes, it was randomly attributed a letter to each shelter. Letters A, B, C and D correspond to shelters from the UK, and letters E, F, G, H and I correspond to Portuguese shelters.

6.6. Final Report

A final report was written and sent by e-mail to each shelter. On the report, shelter's managers can see the classification to each question (GP, RA or TI), and practical advice or recommendations that should be followed to improve animal welfare and adoption rates.

7. Results

7.1. Shelter´s general characterization

7.1.1. Frequency of GP, TI and RA answers

Amongst the 507 collected answers, 77.5% were considered GP, 12.6% practices TI and only 9.9% were considered RA. Globally, there was a higher percentage of GP (80.2%) and of RA (15.7%) in medical health, comparing to behavioural health (Table 6). It was in behavioural health that a higher proportion of practices TI were detected (20.4%).

Table 6. Frequency of GP, TI and RA answers split into medical and behavioural categories

Global Results						
Type of score	**Answers to medical questions**	**%**	**Answers to behavioural questions**	**%**	**Total answers**	**%**
GP	194	80,2	199	75,1	393	77.5
TI	10	4,1	54	20,4	64	12,6
RA	38	15,7	12	4,5	50	9.9
Total	242	100	265	100	507	100

Regarding medical health, 242 answers were collected amongst the 9 shelters. Out of these, 80.2% were identified as GP, 4.1% as practices TI, and 15.7% as RA (Table 7).

Table 7. Detailed frequency of GP, TI and RA answers for Medical Health

Medical Health								
Type of answer	**General+Health**	**Vacc. dogs**	**Vaccines cats**	**Parasites**	**Monitoring**	**Medical treatment**	**Spay/neuter**	**Total**
GP	43	21	12	23	55	23	17	194
TI	1	1	1	1	6	0	0	10
RA	10	5	5	3	10	4	1	38
Total	54	27	18	27	71	27	18	242
GP (%)	79.6	77,8	66,7	85,1	77,5	85,2	94,4	80,2
TI (%)	1,9	3,7	5,6	4,3	8,5	0	0	4,1
RA(%)	18,5	18,%	27,8	11,1	14,0	14,8	5.6	15,7

It should be highlighted that a very high proportion of answers regarding spay/neuter were GP (94.4%), and a higher percentage of GP were found regarding vaccination in dogs (77.8%) in comparison to cats (66.7%). The cat's vaccination program was the medical health strategy with the highest proportion of RA scores (27.8%).

As for behavioral health, GP also scored the highest percentage of the three classifications (75.1%) with 20.4% of answers considered as practices TI and only 4.5% as RA (Table 8).

Table 8. Detailed frequency of GP, TI and RA answers for behavioural health

Behavioural Health								
Type of score	**General**	**%**	**Dogs**	**%**	**Cats**	**%**	**Total**	**%**
GP	45	83,3	82	65,1	72	84,7	199	75,1
TI	6	11,1	37	29,4	11	13,0	54	20,4
RA	3	5,6	7	5,6	2	2,3	12	4,5
Total	54	100	126	100	85	100	265	100

However, it is noteworthy the difference between cats and dogs. Answers regarding cats revealed 84.7% of GP, while for dogs it was 65.1%. The same tendency was found for practices TI (29.4% in dogs versus 13% in cats) and for RA (5.6% in dogs versus 2.3% in cats).

7.1.2. Frequency of GP, TI and RA results by country

7.1.2.1. The UK

The following tables assemble the assessment carried out on the 4 UK shelters, concerning the global results (Table 9), medical health (Table 10) and behavioural health (Table 11).

Table 9. Global Results UK

Global Results UK						
Type of score	**Answers to medical questions**	**%**	**Answers to behavioural questions**	**%**	**Total answers**	**%**
GP	88	83,8	95	87.1	183	85,5
TI	2	1,9	8	7,3	10	4,7
RA	15	14,3	6	5,5	21	9,8
Total	105	100	109	100	214	100

These four shelters scored very high on GP (85.5%), with only 4.7% of practices TI and 9,8% as RA. With the exception of TI answers (7.3% behavioural health versus 1.9% medical health), the other categories (GP and RA) disclose a better performance on behavioural practices than medical practices.

Amongst the 105 different answers concerning medical health, 83.8% were considered GP, 1.9% practices TI, and 14.3% RA (Table 10). Vaccination in cats had a better score of GP (83.3%) than vaccination in dogs (75%). In fact this preventive strategy revealed a 25% of RA, compared to 16.7% in cats. Monitoring was the health indicator with the highest percentage of GP (90.3%) and the lowest percentage of RA (6.5%)

Table 10. Medical Health Results UK

	Medical Health UK							
Type of score	**G+EH**	**Vacc. dogs**	**Vacc. cats**	**Parasites**	**Monitoring**	**Medical treatment**	**S/N**	**Total**
GP	21	9	5	9	28	9	7	88
TI	0	0	0	1	1	0	0	2
RA	3	3	1	2	2	3	1	15
Total	24	12	6	12	31	12	8	105
GP (%)	87.5	75	83.3	75	90.3	75	87.5	83.8
TI (%)	0	0	0	8.3	3.2	0	0	1,9
RA (%)	12.5	25	16.7	16.7	6.5	25	12.5	14.3

Regarding behavioural health, 87.1% of the 109 answers were considered GP, 7.3% TI and only 5.5% RA (Table 11). Cat´s answers (shelter B and D) showed a higher proportion of GP (96.6%), than dogs (80.4%), which still had 10.7% of practices TI and 8.9% of RA, compared to none TI and only 3.4% RA in cats. Moreover all dog's RA answers were given by shelter C.

Table 11. Behavioural Health Results UK

Behavioural Health UK								
Type of score	**General**	**%**	**Dogs**	**%**	**Cats**	**%**	**Total**	**%**
GP	22	91.7	45	80.4	28	96.6	95	87.1
TI	2	8.3	6	10.7	0	0	8	7.3
RA	0	0	5	8.9	1	3.4	6	5.5
Total	24	100	56	100	29	100	109	100

7.1.2.2. Portugal

Table 12 summarizes the global results obtained from the 5 Portuguese shelters.
GP answers from Portugal were 71.7% of GP, while 18.4% of practices TI and 9.9% of RA were recorded.

Table 12 . Global Results for Portugal

Global Results Portugal						
Type of score	**Answers to medical questions**	**%**	**Answers to behavioural questions**	**%**	**Total answers**	**%**
GP	106	77.4	104	66.7	210	71.7
TI	8	5.8	46	29.5	54	18.4
RA	23	16.8	6	3.8	29	9.9
Total	137	100	156	100	293	100

Regarding specifically to the medical health component, amongst the 137 answers, 77.4% were considered GP, 5.8% practices TI and 16.8% RA (Table 13). Vaccination in cats had a lower score of GP (58.3%) comparing to dogs (80%), and a higher percentage of RA (33.3%), comparing to dogs (13.3%). Conversely, spay and neuter had 100% of GP. After vaccination in cats, monitoring had the lowest percentage of GP (67.5%) and the highest proportion of practices TI (12.5%) between the different categories. General + health exam also had a quite high percentage of RA (23.3%).

Table 13. Medical Health Results for Portugal

Medical Health Portugal								
Type of score	**G+EH**	**Vacc. dogs**	**Vacc. cats**	**Parasites**	**Monitoring**	**Medical Treat.**	**S/N**	**Total**
GP	22	12	7	14	27	14	10	106
TI	1	1	1	0	5	0	0	8
RA	7	2	4	1	8	1	0	23
Total	30	15	12	15	40	15	10	137
GP (%)	73.3	80	58.3	93.3	67.5	93.3	100	77.4
TI (%)	3.3	6.7	8.3	0	12.5	0	0	5.8
RA (%)	23.3	13.3	33.3	6.7	20	6.7	0	16.8

Concerning the behavioural health component, 66.7% were considered GP, 29.5% practices TI and 3.8% RA (n=156) (Table 14). Comparing dogs and cats, behavioral health in cats revealed a higher percentage of GP (78.6%), and a lower percentage of practices TI (19.6%) and RA (1.8%). Conversely, dogs had 52.9% of GP, 44.3% of practices TI and 2.8% of RA.

Table 14 - Behavioural Health Results for Portugal

Behavioural Health Portugal								
Type of score	**General**	**%**	**Dogs**	**%**	**Cats**	**%**	**Total**	**%**
GP	23	76.7	37	52.9	44	78.6	104	66.7
TI	4	13.3	31	44.3	11	19.6	46	29.5
RA	3	10	2	2.8	1	1.8	6	3.8
Total	30	100	70	100	56	100	156	100

7.2. Results by categories

7.2.1. Medical health and physical well being

7.2.1.1. General and health exam

In this section, 4 out of 6 questions scored RA answers. All 9 shelters had veterinary programs, including all the items listed on question 2 (GP), except shelter G, which did not perform "*Health check on the intake*" (RA); therefore all animals were examined by trained staff around the time of intake, except in shelter G (RA). Regarding re-examinations after intake, A, B, D and E did routine physical exams, ranging from daily exams, to exams every three months (GP), while the remaining re-examined more scarcely (RA). All shelters recorded their physical

examinations findings (GP). Finally, hygiene methods during clinical exams got several different answers: A, B, E, F and I used all the methods listed (GP), while the remaining only used some (RA).

7.2.1.2. Vaccines

7.2.1.2.1. Dogs

All shelters vaccinated all their dogs with core vaccines (GP). However, when asked "*when*", answers were discrepant. Shelters D, G and H vaccinate on intake, or even before the dogs enter (GP), a practice that is achieved whenever possible by E (TI). Shelters A, F and I vaccinate within 24 hours, and C after seven days of intake (RA). Puppies start being vaccinated also at different ages, ranging from 4 weeks, to 3 months, and revaccinations range from every 2 weeks to every 4 weeks. Intervals continue until the puppies are 12 or 16 weeks, depending on shelters. The protocol for puppies includes protection against CDV, CPV-2, CAV-2 and leptospirosis (if 8 weeks or older). Some shelters also vaccinate against Canine Parainfluenza Virus (C and D) and *Bordetella spp* (A). The 4 UK shelters very rarely or never diagnose CPV, except C (sporadically), but they never diagnose CDV. Some Portuguese ones diagnose CPV every few months (E, H and I) or very rarely (F and G). All Portuguese shelters diagnosed CDV, due to an outbreak in the country which occurred in 2015-2016. Before the outbreak, they diagnosed CDV very rarely, except shelter E (every few months).

7.2.1.2.2. Cats

All 6 shelters with cats vaccinate all animals (GP), except F that vaccinates when the cat is deemed adoptable, and I, that vaccinates when they can afford it (RA). Only shelters D and G vaccinate on intake (GP), while E does it whenever possible (TI). Kittens start being vaccinated at different ages, ranging from 4 to 10 weeks of age, depending on the shelter, and generally every 2 or 3 weeks, and go until 11, 12 or 13 weeks of age. All protocols include feline calicivirus, herpesvirus and panleukopenia. The 2 UK shelters very rarely (B) or never (D) diagnose panleukopenia, and very rarely (B) or weekly (D) diagnose "cat flu" (mainly herpesvirus+calicivuris). Portuguese shelters diagnose panleukopenia every few months (G) very rarely (E) or never (I), and "cat flu" every few months (E), very rarely (G) or never (I).

7.2.1.3. Parasite Treatment

All shelters have parasite protocols in place (GP), and all animals receive treatment for internal parasites routinely (GP), except shelter C, who treats when "*there is an obvious parasite infestation and when dogs are rehomed"* (RA). All shelters treat for external parasites routinely (GP), except C (only when obvious infestation) and H (only when obvious infestation and on intake) (RA). Shelter B treats cats routinely, but not dogs (TI).

7.2.1.4. Monitoring and response to disease

All shelters monitor and register daily observations of health and behavioural well-being (GP), except H (RA). All shelters practice group housing. B and D only do pairings, and are also the only shelters making special considerations for group health monitoring (GP).

The majority of the shelters provide staff with training sessions and written instructions identifying conditions warranting immediate behavioural intervention (GP), except G and H (RA), while D provides training but not written instructions (TI). Again, all provide staff training and written instructions for conditions needing immediate medical attention (GP), except H (RA). Also, all shelters train their staff to suspect and respond to suspected zoonosis or other infectious diseases problems that pose an immediate risk to the population (GP), except E, where staff has only some awareness on the subject, and H (RA).

When there is an emergency out of hours, all shelters either phone the veterinarian for instructions or transport the animal immediately to the veterinarian (GP). In every shelter, sick and injured animals are monitored daily by trained medical staff (GP), with the exception of shelter C (RA). Lastly, for animals with suspicion of infectious disease, most shelters use isolation blocks (GP), or intake blocks with proper conditions for isolation in the case of A (GP), while F and H isolate, but not in adequate isolation facilities (TI).

7.2.1.5. Medical Treatment

In every shelter, staff providing treatments have the necessary training, skills and resources to ensure that treatment is administered correctly and safely (GP). Shelters A, B, E, F, G and I have a clear policy for handling disease problems that may develop after adoption (GP), while C, D and H have not (RA). However, all provide information for adopters about the presence of any infection or condition known to be present at the time of adoption and provide them with a copy of any treatment records (GP).

7.2.1.6. Spaying and neutering

All shelters run programs on spaying and neutering, either while the animals are in the shelter, or after adoption (GP), except C, which does not spay or neuter (though they advise adopters to do so) (RA). The policies are as following: A neuters all dogs with 4 months or older; at B, "*Bull breeds and cats are all neutered. Puppies are neutered at 6 months or 10 months (if large breeds). All others receive vouchers and adopters are usually compliant*"; D neuters all animals; shelter E also neuters all, and if animals are adopted before surgery, adopters can do it afterward in the shelter for free. It also has a TNR program; F also neuters all, and has too a TNR program; at G all animals are neutered, except male puppies. The adopter signs a spay/neuter term and a day is scheduled for the intervention. The cost is covered by the

adopter for a symbolic value). However, there is no information concerning adopter's compliance; shelter H neuters all animals older than 5 months. Younger animals may return to be neutered but at the owner's expense; shelter I tries to spay/neuter all animals. If they are not spayed/neutered by the time of adoption, the owners must sign a responsibility contract that the animal will be neutered at their own expense.
In all shelters, animals are not allowed to breed.

7.2.2. Behaviour and Enrichment

7.2.2.1. General

At shelters A, B, D, F, I, staff is trained to recognize body language and other behaviours that indicate animal stress, pain and suffering as well as signs that indicate successful adaptation to the shelter environment (GP). The same does not happen in H (RA). For C and E, some staff is trained, other is not, and in shelter G, staff has informal training (TI).

All shelters begin the assessment of an animal's behaviour at the time of intake (GP). In seven of them, staff performing behaviour evaluations receives adequate training in performance, interpretation and safety (GP), except in E (RA), while in shelter H some specific animals are evaluated by the volunteer trainers (TI). All shelters use positive reinforcement as the primarily based training method (GP).

In seven shelters, any animal experiencing mental suffering, distress or behavioural deterioration is assessed and treated in a timely manner, or humanely euthanized (GP). However, A and H only make that decision whenever possible (TI). In regards to feral or aggressive animals, who cannot be provided with basic care, daily enrichment or exercise without inducing stress, H is the only one who keeps them long term (RA), in opposition to all other shelters, which choose euthanasia (GP). Shelter F also releases feral cats in colonies whenever possible (GP).

7.2.2.2. Dogs

Most shelters collect behavioural histories from owners or finders at time of surrender (GP), except C (RA) and H that only obtains these data occasionally (TI).
Regarding the monitoring of behaviour and mental well-being, only shelters B, C and D do systematic daily monitoring (GP), while A, E, F, G, H and I rely on staff and volunteers noticing something some changes (TI).

All shelters provide beds/bedding for the dogs (GP), except shelter F that only provides it for some groups (RA), claiming that many dogs destroy them. D, E, G, H and I provide hiding

places for dogs in their kennels (GP), while A and B only do it for shy dogs (TI), whereas shelters C and F do not provide hiding places (RA).

All shelters have enrichment programs (GP). They were asked to give examples of the types of enrichment, as listed: A uses kongs® and other toys, walks, games, training, offsite visits for long-stay dogs, pairing with another dog when appropriate; B does walks with the dogs (3 to 4 per day); interactive games, agility, sand parks, tuna training (they spread tuna in the parks so the dogs can search, the so called “nose work”). They also use kongs® and other toys, hang swede in the kennels, provide quiet time in chill out rooms, and Tellington Touch™; shelter C provides walks, exercise and toys; D offers walks, rawhides to chew, toys, kongs® stuffed with food, cardboard boxes full of treats and training; E provides walks and some toys, the same for F, who also provides “play yards”; G offers walks, play yards and gives kongs® for single housed dogs; H does walks, socialization, basic obedience training and some toys; I offers “play yards” as enrichment.

Only shelters A, B and D provide toys and other in-kennel enrichment daily (GP), while E, F, H and I only provide toys when staff time allows it (TI) and C, F and G offer toys to only some dogs (TI). Shelters A, B, C,D, F and G use feeding as an enrichment opportunity (GP), while E, H and I do not (TI).

Most shelters provide dogs with opportunities for positive interactions with people, outside daily routines, such as cleaning and feeding (GP). However, at F, it only happens if staff time allows. Shelter H is not able to provide it for all dogs daily, and at I animals may spend some time with volunteers (TI). As for regular quiet time with people, it is provided by most shelters (GP), except F and H, who only do it if staff time allows (TI), while C does not provide quiet time (RA).

The majority of the shelters have a puppy socialization program (GP). However, H only socializes puppies if staff time allows, and for I, it depends on the situation (TI), while C does not have a socialization program for puppies (RA). This shelter also does not allow dogs to have supervised interactions with others (RA), a practice supported by A, B, D, F and I in staff-supervised playgroups (GP). Shelters E, G and H also allow it but include unsupervised groups (TI).

When behavioural needs or well-being concerns arise, shelters A and F implement a defined behavioural modification or behavioural treatment plan (GP). This is also done by H, but only for some dogs, due to the lack of volunteer trainers (TI); B and D also provide continued, specialized, or expanded enrichment (GP). At shelters E, G and I, staff tries to give extra care whenever possible. This was also replied by C (TI) that however may also transfer the animal to another agency or foster care situation with resources to provide appropriate care (GP).

While all shelters evaluate behaviour prior to adoption (GP), H, B E and I do not use the information gathered from the behavioural evaluations to its full potential (TI), contrary to A, C, D, F and G, that apply this information to make transfer decisions, to initiate behavioural treatment or modification programs, to help with pet matching or create adoption criteria, and to support management decisions (GP).

7.2.2.3. Cats

It is reminded that only 6 shelters had cats (B, D, E, F, G and I).

All shelters have a structured program to support feline behaviour and provide enrichment (GP), and every shelter collects a behaviour history from an owner at the time of surrender (GP).

Regarding the procedures to reduce the stress at intake, all shelters do the following: separate cat's intake room from dog´s; the cat is carried covered by a towel, and transported carried in a carrier/box that stays with the animal (GP).

Some shelters have two compartments in each cat housing unit (GP), namely B, D and F, who does mainly group housing, as does G (GP). Shelter E does group housing as well, but its quarantine has only one compartment (TI).

All cats in all shelters are given beds in their enclosures (GP), and all are provided with hiding places and opportunities to scratch (GP), except in E, that only provides it for some cats (TI). All shelters provide cats with toys (GP).

Most of the shelters give out of cage time to their cats, especially if they are "long-term stay" animals (GP), except in G and E, whose cats live in group rooms, but do not enjoy out of cage time (TI).

The public is allowed to interact with cats in their housing units on the adoption floor, in all shelters (GP).

The cat's behaviour and mental well-being are daily monitored at shelters B, D and F (GP), while E, G and I rely on staff/volunteers to notice alterations (TI).

All shelters have a kitten socialization program (GP), except I, who gets kittens out of the shelter for foster families as soon as possible (GP), and G, which does not have a socialization program (RA). Only B, D and G use food as an enrichment opportunity (GP). Lastly, all shelters perform behaviour evaluations (GP).

8. Discussion

8.1. General discussion

8.1.1. Overall results

The majority of the answers were considered as GP (77.5%). It is important to notice that with the addition of a third classification – practices to improve (TI) – the proportion of RA answers diminished. This is because all answers that were considered as practices TI would be scored as RA by the Koret Virtual Consultant scoring system. Overall there were 12.6% of practices to improve and 9.9% RA, which are fairly good results. However, it should be emphasised that these results may not reflect the reality, both in the UK and in Portugal, as the sample was not representative.

It is noticeable the higher percentage of GP (80.2%) and of RA (15.7%) in medical health, compared to behavioural health, that showed however a higher proportion of practices TI (20.4%) comparing to medical health TI (4.1%). This difference may be due because medical health questions are more straightforward and easier to be scored either as GP or as RA than behaviour health questions.

8.1.2. Results by country

In the UK, the percentage of GP was slightly superior in behavioural comparing to medical health, with the former also having a lower percentage of RA, with a difference of almost 10%. This difference may be influenced by the very good results achieved in cat's behavioural answers, with 96.6% of GP and only 3.4% of RA, comparing to dog's 80.4% of GP and 8.9% of RA. All these RA were recorded at the same shelter (C), which needs more guiding and training regarding behavioural issues, though this situation may also be explained by a lack of resources and time.

In Portugal, the percentage of GP was higher in medical health (77.4%), but this indicator showed also a higher frequency of RA (16.8%), when compared to behavioural health with only 66.7% of GP. The proportion of practices TI was quite high (29.5%), revealing a considerable space for improvement. The difference between answers concerning dogs and cats was noticeable. While the former had 52.9% of GP and 44.3% of practices TI, cats had a better percentage of GP (78.6%) and a much lower percentage of practices TI (19.6%). Possible explanations to these findings will be discussed further ahead.

Although comparing the answers from the two countries was not the aim of this work, because of lack of representativeness of the sample, there are a few comments that should be made

out of this pilot study. Though medical health did not show considerable differences between the two, the UK had a higher percentage of GP, and lower proportion of practices TI and RA. Monitoring was the category that most influenced this outcome, with 90.3% of GP in the UK, comparing to 67.5% in Portugal.

As for behavioural health, the difference between the two countries was quite divergent, with 87.1% of GP for The UK and 66.7% of GP for Portugal, which conversely had a higher percentage of practices TI (29.5%). These results were mainly influenced by dog´s answers. It seems these shelters in the UK are more aware of behavioural needs and issues comparing to the Portuguese ones, and they invest more time and resources on this area. Though, more robust studies would be necessary to confirm this trend.

8.1.3. Results by category

8.1.3.1. Medical health

8.1.3.1.1. General and health exam

In the general and health exam section, 4 out of 6 questions scored RA. Recognised areas of alert include:

i) Health check on intake that must be performed by trained staff. This exam will permit to identify injuries that require immediate veterinary care, signs of infectious disease, as well as a scanning for microchip and other identification that could allow for a fast location of the animal´s owner. (Newbury et al., 2010)

ii) Routine re-examinations after intake: KVC considers that animals should be re-examined "*Before any change in status or change of housing area*". They advocate monthly check-ups, very important to detect subtle problems, both in health and behaviour. While shelters should aim for this standard of care, it is important to take into account that all shelters are different, and it might be challenging for some to have the human resources necessary to perform monthly exams. On the other hand, some shelters keep animals for large periods, so it is important to re-examine these animals periodically, since it can be months or even years since they last changed status or housing areas.

iii) Hygiene methods when performing clinical exams between animals: personal hygiene is a crucial aspect of biosecurity within the shelter environment. The staff, including veterinarians, can act as fomites; therefore hand sanitation is of outmost relevance to prevent disease transmission. This can be accomplished through proper hand washing, use of hand sanitizers such as gels, and use of disposable gloves. Surfaces should also be thoroughly disinfected, after the removal of any visual organic matter. It is

extremely important to disinfect the surfaces where animals are examined, since it´s a potential fomite. Therefore, it is recommended to use a fast acting disinfectant, if possible, effective against nonenveloped viruses (Dvorak et al., 2009).

8.1.3.1.2. Vaccines

Shelters showed great concern about vaccination programs. All 9 shelters vaccinate all dogs with core vaccines, but for cats, unfortunately some RA were found. For instance, shelter F only vaccinates cats when they are deemed adoptable. This is because they receive a lot of feral cats, and while some enter the shelter directly from TNR programs and are released after surgery, others may still be adoptable, so they opt to wait. However, this poses various risks, both to the individual animal and to the shelter´s population, as the scientific consensus nowadays is that all animals entering the shelter should be vaccinated on intake, lamentably a recommendation that not all the shelters follow, as will be discussed further ahead. Shelter I vaccinates when they can afford it, as they don´t always have budget to buy vaccines. While it is understandable that vaccines are fairly expensive, it is recommended that the shelter vaccinates all cats.

Other areas of alert include the timing of start and the periodicity of vaccination in puppies and kittens, and for how long they should be vaccinated. In fact, shelters gave several answers, but following international recommendations, summarized on Annex 3, core vaccines should be given to all kittens and puppies. The weeks vary slightly depending on the guidelines, but the general recommendation is to begin at 4-6 weeks of age, and then vaccinate every 2-3 weeks until 16 weeks of age or more, if they are still at the shelter (Day et al., 2016; Scherk et al., 2013; Welborn et al., 2011). It should be noticed, however, that in order to not prolong the discussion on this already extensive theme, timing of vaccination in kittens and puppies was not classified.

8.1.3.1.3. Monitoring and response

Our pilot study showed that the UK shelters scored a much higher proportion of GP comparing to Portugal. This led to the identification of priority areas for improvement, such as:

- **i)** Daily observations of health and behavioural well-being should be strictly monitored and registered by staff, and their communication should be fast and clear (UC Davis, 2015c);
- **ii)** Considerations when monitoring health of animals in groups: feeding time provides a good opportunity to observe individual food intake and conflicts around food; monthly weighing and body conditioning scoring is relevant mainly for long term group housed animals; a physical exam should always be made whenever vomit, diarrhoea, abnormal urine, or nasal discharge is observed;

iii) Staff should be trained and provided with written instructions identifying key conditions warranting immediate veterinary and behavioural intervention. In order to ensure animal well-being and safety, it is important that situations of fear, aggression and severe stress are promptly recognized and coped with by staff (Koret Virtual Consultant, 2016)*;*

iv) Training of staff to suspect and respond to infectious disease is also imperative, and will be discussed later on; sick and injured animals should be monitored daily by medical staff; keeping updated protocols in place to cope with infectious disease (sporadic cases or outbreaks) is fundamental, and will be highlighted later;

v) Having a clear policy for handling disease problems that may occur after adoption, keeping the adopters informed about the presence of any infection or condition known to be present at the time of adoption and providing them with a copy of any treatment records are advisable procedures (Newbury et al., 2010).

8.1.3.2. Behavioural health

Behavioural health showed a lower percentage of GP answers overall, when compared to medical health. Between the UK and Portugal, the former had a higher percentage of GP, as already discussed. Amongst the 6 general questions, 3 questions had RA answers, all from Portuguese shelters, and 3 questions had TI answers, both from the UK and Portugal. Most shelters showed general behaviour concern, based on the given answers, yet areas for alertness include: i) staff training, in order to recognize body language and other behaviours that indicate animal stress, pain and suffering, as well as attitudes that suggest successful adaptation to the shelter; ii) adequate training in performance, interpretation and safety for everyone performing evaluations; iii) outcomes for feral or aggressive animals, which cannot be provided with basic care, daily enrichment and exercise without inducing stress.

8.1.3.2.1. Dogs and cats

An interesting finding was the total count of RA in dogs versus cats. In fact, there were more answers that scored RA and practices TI in dogs than in cats. Out of the 14 dog questions eligible for classification, 6 had RA, and 11 revealed practices TI, and only 2 questions (54 and 63) got all the 9 answers classified as GP, resulting in a final result of 65.1% of GP overall. Conversely, when looking at the 14 cat's questions, only 2 had risk alerts, and only 6 had practises TI. However, is important to remember that only 6 shelters admitted cats, while all 9 of them welcome dogs, which distorted our sample and may have interfered with the results, so any interpretations need some caution.

One possible explanation for this difference might be the fact that cats need fewer resources than dogs to fulfil their behavioural needs and enrichment. Dog walking, training and exercising

are time consuming activities and engage a large amount of the shelter´s physical space. Fenced play yards, toys, collars, leashes and treats, are key components of an enriching program that represent a financial challenge for shelter managers.

Another explanation might be linked to lack of awareness by some shelters of dog's behaviour. An additional variable that may be related is the capacity for care of shelters, as it is expected that for those exceeding their capacity for care, some elements of animal care, namely behaviour and enrichment, may be put in second place in detriment of feeding, cleaning and medical health, for instance. However, enrichment should be given the same amount of importance as the other components of animal care (Newbury et al., 2010).

Nevertheless, all shelters replied that they accomplish enrichment programs, for cats and for dogs. While some are proud of the level of enrichment they provide, most would like to improve, which denotes concern for this topic, being a very positive indication. Identified areas of alert and improvement comprise:

i) The need to improve data collection of behavioural history from owners or finders;

ii) The importance of supplying beds to dogs, being shelter F the only that does not provide beds to all dogs, claiming that some dogs destroy their beds, which may be linked to frustration and lack of other forms of environmental and behaviour enrichment. It is important to lay emphasis on beds providing comfort and helping with thermoregulation, protection of the skin and musculoskeletal system;

iii) Providing dogs places to retreat or hide is very important to their welfare, as a sense of control is needed for mental well-being, including control of unpleasant feelings such as anxiety and fear (McMillan, 2002);

iv) The significance of investing on toys for dogs, feeding enrichment, opportunities for positive interactions with people outside of daily routines, such as cleaning and feeding, quiet time with people, puppy socialization program, dog-dog supervised interactions, and the response to behavioural needs or well-being concerns.

v) The need for out of cage time for long term stay cats and kitten socialization programs.

8.2. Specific question discussion

Whenever possible we made group discussion of related questions in order to be synthetic and to integrate points of view and recommendations.

8.2.1. Question 1, 2 and 3[6]

Regarding the first question "*Does the shelter have a veterinary program*?", all 9 shelters answered "*Yes*", which is considered as a GP. However, when inquired about "*If so, what does it include*?", shelters G did not include "*Health check on the intake*", and consequently, was scored as RA. It was also the only shelter who answered "*No*" when questioned if all animals were systematically examined by trained staff at or around the time of intake.

The ASV guidelines consider that a functional medical health program is mandatory to guarantee the welfare of healthy and non-healthy animals. As a "must", they state that a proper shelter medical program should include veterinary supervision, where evaluation, preventive care, diagnosis and treatment are provided by trained staff. This team includes veterinarians, veterinary nurses and other staff trained to perform basic physical examinations.

8.2.2. Question 9

"*When/If a dog is vaccinated, when does this occur?"* revealed many different answers. Shelter D and G vaccinate "*immediately after intake*", as does H, that also vaccinates a dog "*before it comes it to the shelter*", whenever possible. These answers were all considered as GP.

Shelter E vaccinates "*usually within 24 hours of intake, but they are vaccinated immediately if there is a vet on site"*. As they have full time veterinarians on site, and are aware of the importance of vaccinating immediately, this was considered as a practice TI.

Shelters A, F and I vaccinate "*within 24 hours of intake*". This delay may lead to infections that may evolve as epidemics with high fatality rates such as dog parvovirus or cat panleukopenia. Therefore, they will be considered as RA. B vaccinates "*at the next visit of the veterinarian*", also considered as a RA.

Shelter C answered they only vaccinate at *"the next available time (to visit the vet), but only after the seven days holding period."* This facility provides services to the local council, taking mostly stray dogs. They claim that, given the possibility of the dogs having an owner, they are not allowed to perform many interventions to the animals within the holding period, which is seven days in the UK. This is however a RA because there are no legal impediments to vaccinate dogs during the holding period.

Vaccinating on intake or prior to intake is considered the best practice, both by International Guidelines, and by Shelter Medicine experts. As already explained, it is not feasible to use the vaccination protocols for individual pets in a shelter setting and also not possible to have a universal protocol that suits every shelter.

Shelters have a high turnover rate, where the exposure to infectious disease agents is very high, and the consequences of infection can be dramatic for the affected animal, the shelter population, and to the financial situation of the facility.

It is important to notice that for most dogs entering the shelter, it is not known whether or not they are immune to the most common infectious disease, because antibody titer is not yet a widespread strategy, and it is costly. Yet, there is some evidence that many animals may not be immune .For example, in the USA, a study found that 64.5% of dogs entering a shelter had insufficient protective antibody titers for CDV and/or CPV. While this may not reflect the reality of other shelters in other countries, it exemplifies the value of antibody titrations (Lechner et al., 2010).

Many authors recommend that all animals entering the shelter should be vaccinated with MLV (Day et al., 2016; Scherk et al., 2013; Welborn et al., 2011). After a single dose, these vaccines provide a relatively rapid onset of immunity, approximately 4±3 days in the absence of MDA. Vaccines for CDV may provide protection within 1-2 days, CPV-2 in about 3 days, and CAV-2 in around 5 to 7 days (Welborn et al., 2011).

This prophylactic measure should be extended to pregnant and the mildly sick and injured animals, because the risk of exposure is so high in most shelters, that makes up for the risk of abortions or possible adverse effects (Newbury et al., 2010; Welborn et al., 2011). Because animals may not mount an optimal response, it is recommended that a booster should be given, no less than two weeks apart. In animals with severe signs of illness, vaccination should always be delayed, unless they are at a high risk of exposure (Welborn et al., 2011).

Based on this evidence, all minutes count when deciding to give a vaccine on intake, thus justifying the classification of GP and RA discussed previously for each shelter.
However, even though these are considered the best practices, it is worth to mention that they may cause some logistic problems, as not all shelters have someone available at all times to administer a vaccine. Also, shelters with exceptional quarantine facilities and with good biosecurity practices in place will probably have a much more reduced risk of exposure to infectious disease. Perhaps for those cases, immediate vaccination on intake would not be such an urgent practice nor considered a RA not to do so. However, this study did not involve assessing quarantine practices and facilities, making it impossible to have a more thorough discussion on this subject.

Shelters could invest in staff training, so they could learn how to properly store and administer vaccines, as well as learn the possible adverse reactions and how to cope with them, following a protocol established by a veterinarian This way, animals could be vaccinated immediately after intake, even if there is not a veterinarian available. For Portugal, this is illegal, as

vaccination is considered a medical act, not even allowed to be performed by a certified veterinary nurse without direct medical supervision, which poses a controversial conundrum for many Portuguese shelters.

8.2.3. Question 26 and 27

Once asked "*When do animals receive treatment for internal parasites?"* all shelters except one replied they treat their animals routinely. Then, for those that gave this answer, it was asked "*how often*", that brought forth different answers. A, B and D give treatment "*on intake and every 3 months"*; E deworms "*on intake, when the animal has it´s vaccine booster (usually 3 weeks after the first dose) and every 4 months until adoption"*; F treats "dogs *on intake and every 6 months, while cats are treated monthly*"; G treats "*on intake, when there is an obvious infestation, and in general, two times a year for all animals";* H treats "*all animals every 4 months"*, and I treats "*on intake, every 6 months, and whenever there is an obvious infestation".* These were all considered GP. Shelter C only treats for internal parasites "*when there is an obvious parasite infestation and when they are rehomed*", which was considered as a RA.

For the following question "*When do animals receive treatment for external parasites?"* the answer diversity increased. Five shelters treat for external parasites routinely: A and D "*on intake and every 3 months"*; E follows a similar protocol as for internal parasites; F treats on intake with a spot-on, and sprays the dog kennels daily with cipermetryne, in Summer months; shelter G treats "*on intake and gives baths to the dogs with shampoos against external parasites routinely"*; I treats "*on intake and routinely"*, depending on the product available (collar, spot on). These were considered GP. Shelter B treats for cats routinely for fleas but not dogs, unless they have them. This answer was classified as a GP in cats and RA in dogs. Shelter C treats when dogs have an obvious external parasite infestation, as well as does H, who also treats them on intake.

Parasite protocol and recommendations are not as straightforward as for vaccines. Parasites commonly affect cats and dogs in the shelters, and may cause illness, ranging from subclinical to severe disease. Therefore, animals should receive treatment for parasites on intake and at regular periods (Newbury et al., 2010). For example, while gastrointestinal parasites, fur mites, fleas and ticks may be found in Portugal and UK, dogs living in Portugal are at a higher risk of vector born disease such as *Leishmania infantum* (transmitted by sand flies, namely *Phlebotomus* spp), and *Ehrlichia canis* (transmitted by *Rhipicephalus sanguineus* ticks) than dogs living in the UK (Cardoso, Mendão, & de Carvalho, 2012; European Scientific Counsel Companion Animal Parasites, 2012, 2016).

It is worth to mention that effective external parasite treatments are very expensive for a shelter, especially one housing many animals. As an example, to prevent leishmaniosis, a

vector-born disease endemic in many areas of Portugal, with Zoonotic potential, it is recommended the use of synthetic pyrethroids on individual dogs (Pennisi, 2015). A collar impregnated with deltametrine, that also prevents against tick and flea infestation, and lasts around 6 months for sand-flies, could be an option. For the same example, it will be used one visited shelter, housing 650 dogs with access to the exterior, which is a double risk factor according to the European Scientific Counsel Companion Animal Parasites (2012). Knowing that a single collar costs 13€, it would take at least about 8450€ per year just for external parasite treatment, restraining the treatment during the warmer months, as in Mediterranean areas, sand flies are more active from Spring to Fall (Maia & Cardoso, 2015). This reinforces the key role that capacity for care plays an important role in shelter sustainable management.

Considering all these factors, it was considered a GP when a shelter answered that it treats for internal and external parasites routinely (including intake), and a RA otherwise.

8.2.4. Question 33 [6]

When asked if *"Are staff trained specifically to watch for and respond to suspected zoonosis or infectious problems that could pose an immediate risk to the population?"* all but two shelters, H and E said "*Yes*".

Koret Virtual Consultant considers this lack of training as a RA, as training is fundamental to swiftly recognize and respond quickly to illness that threaten the well-being of the animal population, as well as the people who work or visit the shelter. As stated on the ASV Guidelines, facilities should take all the necessary precautions to protect the health of animals, people and the environment in the shelter, and that "*an organization's mission should never be achieved at the expense of public health and safety"*. It also states that shelters should provide both staff and volunteers with training on recognizing zoonosis, who should be addressed in a written infectious contingency plan (Newbury et al., 2010).

8.2.5. Question 36 [7]

The last question of this section was *"What is the protocol for animals with suspected infectious disease?"* the aim of this question was to assess what shelters do in regards to isolation when an infectious disease in present.

Shelters B, C, D, E and G replied that animals *"go to the isolation block"*. A does not have a specific isolation block, yet it isolates the suspected animals in the intake block, that has all the

[6] The information provided by the answers to questions nº 28 to 32 were predictable and/or without the need for in-depth discussion. Therefore, their output was only taken into account on the general discussion descriptive analysis

[7] The information provided by the answers to questions nº 34 and 35 were predictable and/or without the need for in-depth discussion. Therefore, their output was only taken into account on the general discussion descriptive analysis.

necessary conditions. Shelter I hospitalizes their suspected animals at a Veterinary Hospital. All these situations were considered as GP.
Shelter H isolates, but does not have a specific isolation block. As for F "*there is an isolation block. However, it is not used for this purpose, even though the animals are isolated".* It would be considered a RA if a shelter replied that "*animals are not isolated*". Since F and H isolate their suspected animals, it was considered as a practice TI.

It is important to notice that isolation is only as good as the shelter´s infectious disease control and prevention programs, which should be focused on the specific facility environmental factors determinant of disease.

8.2.6. Question 40 and 41 [8]

All shelters, except C, answered *"Yes"* to que question: *"Does the shelter have a policy for spaying and neutering the animals in its care, either while they are in the shelter, or after adoption? (by giving vouchers for example)".* The questioned that followed was *"If yes, what´s the policy?*

Spaying and neutering programs are widely acceptable as an important method to reduce animal overpopulation, and it is a strongly recommended practice for animal shelters to neuter the animals they give for adoption (AVMA, 2016; BSAVA, 2013; Griffin et al., 2016; RSPCA, 2014a). This also supported by DGAV (Briosa, C. & Maia, H., 2010). OIE also advises using methods such as reproductive (including neutering), for stray dog population control (OIE, 2014).

The use of time and cost-effective anaesthetic protocols, standard operating procedures that ensure consistent care and workflow, patient data collection, analysis of morbidity and mortality, and proper staff training, will help to optimize a shelter´s neutering program, improving its efficiency (Griffin et al., 2016).

As explored on chapter 3.3, shelters and other organizations such as rescue groups should aim to allocate the resources spent on spay/neuter programs, depending on the needs of their community, which is only possible to assess if data is collected and analyse (Makolinski, 2013). For example, a shelter in the UK, in a specific locality, might identify that their main problems are free-roaming cat colonies, thus they could focus spending their resources on TNR programs. Conversely, a shelter in Portugal, in any given locality, might identify that one of its main problems is that a great amount of litters of puppies is being admitted to the shelter, relinquished by their owners. This shelter could then focus their resources on education

[8] The information provided by the answers to questions nº 37, 38 and 39 were predictable and/or without the need for in-depth discussion. Therefore, their output was only taken into account on the general discussion descriptive analysis.

programs for the community, and bitch spay programs (free or at low cost), to prevent more litters.

This question was a bit of a challenge to classify. Overall, the shelters had great concerns about neutering, with the exception of C who does not spay/neuters. However, while it is understandable that some shelters might have difficulty in maintaining a neutering policy due to financial restrains, the decision was to be considered as a RA the absence of a policy that spays and neuters the animals given for adoption. All sexually intact adopted animals can potentially contribute to the increase of animal population within the community, contributing indirectly to more shelter intakes. This is supported by evidence, that shows that not only communities with low pet spay/neutering rates have relatively high shelter intake rates, but also that shelters which spay/neuter animals prior to their adoption tend to have lower future intake rates (Marsh, 2010)

8.2.7. Question 42

This question: "*At what age do you start neutering?"* was not intended to be classified as a GP or RA. The aim was to find out when these shelters started neutering their young animals. Shelter A starts at 4 months; B at 6 months, or 10 months for larger breeds of dogs; for C it´s not applicable as they do not spay/neuter; D may start at 8 weeks for cats, and 6 months for dogs; E and F at 6 months; G replied "*after vaccines*"; H starts at 5 months; I responded "*depends on the vet performing the surgery*".

Some arguments supporting spay/neuter programs have been discussed above, but we now want to discuss some arguments supporting early neutering. It is recognized by many veterinarians and animal humane societies that neutering all shelter animals, including puppies and kittens, before adoption will reduce the birth rates of companion animals, and that the benefits outweigh the risk. However, the ASV advocates that to ensure owner compliance, neutering should be performed before adoption, as available data suggests that neutering contracts are marginally effective, and that compliance may be less than 60% (Kustritz, 2007). This means that many adopted puppies and kittens might not return to the shelter to be neutered, or that owners might not use the vouchers, so these animals are potential parents of future litters, contributing to the increase of the animal population, more shelter intakes, and this never ending cycle is never interrupted.

While in the UK the BSAVA and the RSPCA openly support early neutering, it is not possible to evaluate how many shelters are actually following this recommendation, even though shelter A (4 months) and D (8 weeks for cats) are adhering to early neutering. As for Portugal, only H neuters bellow the traditional 6 months of age (6 months). Shelter I, also practices early

neutering in their TNR programs, depending upon veterinarian beliefs. The same situation is starting at E, through its TNR programs.

There is only conjectural evidence about early neutering in Portugal. It is hypothesized that most veterinarians are not familiar with the concept and/or its details, even those who work in shelters or private clinics with protocols with NGOs. Despite the fact that there is not any reported animal census, it is widely defended among animal organizations, municipal shelters and many veterinarians, that there is a problem of dogs and cats overpopulation in Portugal. In 2015, municipal shelters received 23714 dogs and 6486 cats (DGAV, 2016). It is unknown how many are sheltered by NGOs, and there is no estimation on the number of stray cats and dogs. Early neutering might be an option for many shelters, especially those with TNR programs, which are starting to spread around the country.

Shelters could decide to start early neutering by evaluating the contracts/vouchers compliance by adopters, and start planning accordingly to their own data. Even though many veterinarians might be uncomfortable to perform paediatric spay and neuter, there are many resources available on how to safely conduct early neutering programs, including safe anaesthetic and surgical techniques (Joyce & Yates, 2011; Miller, Rekers, Ellis, Ellingsen, & Milovancev, 2015).

8.2.8. Question 44 [9]

Regarding the question "*Are staff trained to recognize body language and other behaviours that indicate animal stress, pain and suffering as well as those that indicate successful adaptation to the shelter environment?",* A, B, D, F, I responded "*Yes*", which was considered a GP; on the other hand, H replied "*No*", a RA. Shelters C and E answered "*Some staff is, some is not*", while in G "*Staff has some training, but in an informal way"*. Since some effort is being carried out already, practices in C, E and G were considered as TI.

One good indication of how successfully an animal is coping with the environment is through behaviour manifestations. For that reason, staff should be trained to recognize body language and behaviours that indicate animal stress, pain and suffering, but should also be able to recognize behaviours that indicate a successful adaptation to the shelter. There are multiple resources and educational tools on this matter. An efficient low cost strategy performed by some shelters is to post sheets with illustrations or photos on key places of the shelter, to share relevant information. ASPCAPro has multiple webinars that can be very useful to improve staff skills and competences (Heather Mohan-Gibbons, 2012).

[9] The information provided by the answer to question nº 43 was predictable and/or without the need for in-depth discussion. Therefore, its output was only taken into account on the general discussion descriptive analysis.

In the UK, some organizations provide proper training to their caregivers. For example, Dogs Trust gives formal training courses, and also provides shelter managers with Standard Operation Procedures (SOP) for animal sheltering, where many topics are approached, including behaviour and training. The RSPCA also has several free resources available, like the "*Welfare of seized dogs in kennels – a guide to good practice*"[10], and "*Guidelines for the design and management of animal shelters*"[11].

In Portugal there is a lack of formal training. Shelters would have much to gain if staff had more training and motivation. According to our experience, many people working in Portuguese facilities are underpaid, overworked, unmotivated, and lack proper training.

8.2.9. Question 48 [12]

"Does any animal which is observed to be experiencing mental suffering, distress or behavioural deterioration assessed and appropriately treated in a timely manner, or humanely euthanized?". This was one of the most sensitive questions to include on the questionnaire. Shelters B, D, E, F, G, I answered "*Yes*". A and H, opted for "*Only whenever possible*". Still, none of the shelters answered "*No*", which was an interesting finding, considering that this is a controversial question, mostly among Portuguese private shelters.

The challenge is to recognize when an animal is in distress or behavioural deterioration. Where is the line between an animal suffering stress for being confined, and an animal with its five fundamental needs seriously compromised, namely "*its need to be able to exhibit normal behaviour pattern"?* The other question that needs to be asked is: "What should one do with these animals?" Surprisingly, it is not a given fact that Portuguese organizations decide in favour of euthanasia, even when it may look clear that the animal is in distress and there are no means to properly treat its behavioural problems. Though, there is not published data to support this view, and we should not generalize to all organizations and shelters in Portugal. However, this is still a subjective matter, very difficult to diagnose with accuracy, and it is also an emotional decision-making conflict. Nowadays, there is a public debate in Portugal, because a new law has been approved in August 2016, prohibiting municipal shelters to resort to euthanasia as a means of population control, and there will be a 2- year transition period. This implicates that from 2018 an animal will not be put to sleep due to overpopulation or lack of economic resources, unless a health or behavioural issue arises, being the decision devolved to the responsible veterinarian.

[10] http://politicalanimal.org.uk/wp-content/uploads/2015/04/RSPCA-Guide-The-welfare-of-seized-dogs-in-kennels.compressed.pdf
[11] http://www.icam-coalition.org/downloads/Shelter%20guidelines.pdf
[12] The information provided by the answers to questions nº 45, 46 and 47 were predictable and/or without the need for in-depth discussion. Therefore, their output was only taken into account on the general discussion descriptive analysis.

That being explained, it is supported by the ASV guidelines that an animal experiencing distress or behavioural deterioration should be either properly treated or humanely euthanized. It is given as much importance to these situations as it would be given to a severe physical health issue, therefore justifying a prompt and effective response (Newbury et al., 2010). Therefore, a positive answer for this question was considered a GP. Shelters A and H were classified as a TI.

In a shelter setting, the lack of control of the animal's environment is an important stress factor, and even short term confinement can compromise physical health (Griffin, 2009a). However, in long-term confinement, is frequent to find animals in distress due to chronic anxiety, social isolation, lack of mental stimuli and physical exercise. When opportunities for coping with these issues lack, animals commonly develop abnormal behaviours (Moesta et al., 2015). Furthermore, not only these problems compromise the animal's welfare and health, but also its chances of adoption. Therefore, by increasing its welfare, it is expected to raise both its wellbeing and chances of adoption (Dalla Villa et al., 2013b). This grounding highlights the importance of measuring the QoL for individual animals in the shelter.

8.2.10. Question 49

"What happens to feral or aggressive animals, who cannot be provided with basic care, daily enrichment and exercise without inducing stress?" Shelters A, B, C, D, E, G and I answered "*Euthanasia*"; shelter F replied "*For cats, we try to introduce them to a cat colony whenever possible. For dogs it is euthanasia*". Shelter H was the only to reply "*Long term confinement*", which was considered a RA. Responding "*Euthanasia*" was considered a GP, as would be "*foster care*", which none shelter chose.

For humane reasons, it is considered unacceptable to keep animals on long term confinement, including dogs showing high levels of aggression or feral cats, when it is not possible to provide them with basic care, including daily enrichment and exercise without inducing stress (Newbury et al., 2010).

The length of stay (LOS) is influenced by policies on intake, outcomes, capacity for care, and animal flow through the system, which ultimately as an impact on animal welfare. So the first step should be to understand why a shelter has long-term stay animals, and what could be done to shorten it.

Shelters are advised to have a policy for aggressive and feral animals. Whenever a shelter decides to keep an animal that behaves aggressively, or has a history of aggression towards human beings or other animals, it is the facility's responsibility to provide not only proper housing, but also proper behaviour management for those animals. This may implicate

structured behaviour programs and experts assistance, such as behaviourist and trainers. Hence, The resources needed to invest on these animals should be properly evaluated (Aziz, 2015).

It is extremely important to identify feral cats. They can be defined as domestic ones who were not socialized, generally free-roaming and do not allow handling by humans. A stray cat it´s not necessarily a feral one and it is essential to distinguish both. These animals find it exceptionally stressful to be captured and handled, so even the shortest of time in captivity can compromise their medical and behavioural health. It is, therefore, imperative to identify these animals and to keep their stay in the shelter as short as possible, enrolling them in TNR programs. However, there are no validated behavioural evaluations or tests that allow to distinguish fearful from feral cats, so shelters often have to rely on animal history and their own experience (Janeczko., 2015).

Physical attributes that may help to identify a feral cat include ear tip removed, which is a widely used symbol to indicate a free-roaming neutered feral cat. They are also generally young and lean. Tomcats are especially noticeable, as they usually have large jowls and scars on the face and ears. These animals behaviour evaluation should only begin after some time to adapt, as not all cats with extremely stressful or aggressive behaviours are necessarily feral, they might be just frightened (Griffin, 2009b).

As for very under socialized/feral dogs, it is impossible to know how many exist in Portugal, although they are targeted here and there across the country, especially in rural areas. Unfortunately, it is much more difficult to find solutions for these dogs in comparison with cats, as Portuguese legislation does not allow dogs to free-roam in public areas, which hinders these dogs to be released in TNR programs. Some shelters keep them on a sanctuary regimen, while others accept them for long term and try to socialize them, but aware that their chances of adoption are very low, and these animals will spend a lot of resources.

8.2.11. Question 56 [13]

"Are dogs given toys and other in-kennel enrichment at the shelter?" shelters A and D answered *"Yes - every day".* The same answer was given by B*,* who also replied *"Yes - Novel toy rotation program allows animals to have a new toy".* These answers were considered as GP. Shelters E, F, H and I replied "*Yes - when staff time allows*". C responded "*yes, but not all of them. Some are not interested, some are possessive*". All the answers from these five shelters were considered as practices TI. Finally, G answered "*No*" (except for the single housed dogs, who receive kongs). This was originally considered as a RA, but given that the

[13] The information provided by the answers to questions nº 50 to 55 were predictable and/or without the need for in-depth discussion. Therefore, their output was only taken into account on the general discussion descriptive analysis.

shelter makes the effort to provide single housed dogs with kongs, as answered previously on question 55, ii will be considered as TI.

Accordingly to the Koret Virtual Consultant "*toys help reduce stress and improve well-being by providing physical and mental stimulation and allowing animals more control over their environment". Toys, such as kongs® and nylabones® help dogs fulfill an important behaviour of the species: chewing".*

Landsberg et al (2012). describes chewing as a part of the normal dog behaviour repertoire, even though in some cases it can become a problem, whether because it is normal but undesirable, being a part of the exploratory and play behaviour, or because it is an outlet of abnormal behaviour (such is the case in separation anxiety), leading, in both situations, to destruction of objects and furniture. Even though it is mostly found in puppies and young adults, who usually have a stronger drive for object play than adult dogs (Landsberg, Hunthausen, & Ackerman, 2012), there are many of the latter that retain these behaviours and enjoy playing with objects. This is also known as solitary play, which is presumably linked to predatory behaviour (Bradshaw, Pullen, & Rooney, 2015). There is not, however, data on the effects of age on play behaviour in sheltered dogs, which might give useful information (Wells, 2004b).

Thus, providing outlets for these needs will help keep (at least some) dogs stimulated, allowing them to exhibit their normal range of behaviours, and preventing them from engaging in undesirable behaviours, such as barking and displacement behaviours, which may progress to compulsive disorders (Landsberg et al., 2012).

As for research supporting the value of toys for shelter dogs, results are somewhat contradictory. A review paper (Wells, 2004a) found that while some studies suggest that toys can help promoting animal welfare, others argue that they have no effect on kennelled animals. There is some evidence showing that laboratory-housed dogs benefit more from toys than those living in rescue shelters, perhaps due to the environment on shelters being so stimulating (not necessarily in a good way). It is also reported that puppies may show interest in the same toy for several weeks after it being introduced, contrary to adult dogs that get used to new toys in a matter of days. Therefore, toy rotation is suggested.

This author supports this theory again on another paper. In this one, it is shown that dogs spend little of their time playing with the toys provided, but that the behaviour of the dogs is significantly influenced by the type of toys, even though their interest in them wanes over time. It showed that dogs had preference for chewable toys, such as *nylabone*®, contrary to ones like tug ropes, which are designed for dog-human and dog-dog play (Wells, 2004b). A different study found these showed preference for softer, more manipulative toys, such as the *squeaky bone*™ and the *soft teddy*™, in detriment of most robust ones, such as the *boomer ball*®,

which somehow invalidates the requirements that toys placed in kennels should be robust, easy to clean, and pose low risk of ingestion, taking in account that dogs seem to prefer otherwise, indicating that a compromise between enrichment and safety is needed (Pullen, Merrill, & Bradshaw, 2010). Toys that may be filled with food are an all different matter, which will be discussed further ahead.

There is, however, a different reason to provide toys for shelter dogs. Evidence shows that their mere presence or other enrichment items, even if the animal is not seen playing with it, is seen by the public (potential adopters) as more desirable than a barren kennel, increasing the chance of a dog being rehomed (Wells & Hepper, 2000).

Several shelters, including those visited by the author in the UK, are now using this strategy, both in dogs and cats. The suggestion is that public might view these animals as desirable pets, rather than unwanted ones. On the other hand, by providing dogs with toys that may increase the amount of time they spend displaying behaviours they might prefer, such as active ones, the public perception might be improved (Wells, 2004b).

Ultimately, it is important to retain that dogs are very social animals, needing contact with both human and conspecifics, and that by being an opportunist species, they spend much of their time active and exploring, needing a stimulating environment in order to do that. So while toys and other kennel enrichment are important, it is mandatory that other types of enrichment are provided, such as walks, training and group play sessions, so all their social, mental and physical needs are fulfilled.

8.2.12. Question 57

For the question *"Does the shelter use feeding as an enrichment opportunity?"* A, B, C,D, F and G replied "*Yes*", which was considered as a GP, while shelters E, H and I replied "*No*", considered as a practice TI. This answer is considered as RA in Koret Virtual Consultant. However, bearing in mind that this may be a new concept to some shelters, who may regard this as a logistic challenge, it was thought that considering this as a practice TI might be a better approach.

To better understand why using food as enrichment may have such importance to shelter dogs, it is important to remind these animals are inherently hunters and scavengers and food acquisition behaviours are still deeply embedded in the species (Landsberg et al., 2012).

As written by Donaldson (2013), even after hundreds of years of selection in order to eliminate the predatory behaviour of some breeds, it has failed in most individuals. To this day, dogs still visually track, chase and bite moving objects, as did their ancestors. One way of better understanding this concept is by looking at the predatory sequence, suggested by wolf

biologist David Mech: "*search; stalk; rush; chase; bite/hold/shake/kill; dissect and eat*". Other behaviours related to food acquiring may also include chewing and food- guarding. It is suggested that by providing games for the dogs that mimic these behaviours, they can be properly stimulated, thereby helping avoid several behavioural problems. There are numerous games that may help burn out this so called "*predatory energy*", and here enters feeding as an enrichment opportunity. In the words of Donaldson: "*free food in a bowl plays against the genetic legacy of dogs".* Thus, it is suggested that it is possible to meet some behavioural needs through meals, namely the "*search, chase, bite and hold" part* of the predatory sequence (Donaldson, 2013). The traditional, tough practical way of feeding dogs by placing food in a bowl once or twice a day poses little challenge, stimulation or effort for them. This contributes to a lack of interesting and stimulating environment, that may lead animals to engage in undesirable or even displacement behaviours (Landsberg et al., 2012).

So this is understandably an optimal opportunity for shelters to improve the individual dog's enrichment, particularly those who live in individual kennels, and may not have as many social opportunities as those living in groups, which may increase their need for daily enrichment. Shelters may be worried about resource guarding between dogs living together, so proper monitoring of each individual group should be implemented, and adjusted to each situation.

8.2.13. Question 58

Regarding the question *"Do adult dogs have opportunities for positive interactions with people outside of daily routines such as cleaning and feeding?",* shelters D and E replied "*Yes - volunteer program"*, A and C "*Yes - staff are allowed time each day to have quality time with dogs"* and B and G answered both (volunteer and staff). These answers were considered as GP. Shelter F replied "only if staff time allows", H answered "*some of the dogs do, but not all of them*", while I responded "*animals may spend some time with volunteers"*. These three answers were considered as practices TI.

The ASV guidelines consider that daily husbandry routines are not enough to provide the animal´s social needs, and that positive social interactions, such as walking and playing should be provided daily, especially for long-term housed animals. In situations where concerns about infectious disease control arise, a balance with social interaction should be found and provided. Biosecurity can be guaranteed by keeping the animal in its enclosure while providing social interaction (Newbury et al., 2010).

Social isolation is usually a major concern in animal shelters, contributing greatly to increased stress. Evidence shows that social isolation is the most stressful factor in a kennel environment, and that humans are an important resource for dogs (Coppinger & Zuccotti, 1999). There is consistent scientific evidence supporting the importance of social interaction

with humans for shelter dogs (Belpedio, 2010; Coppola, Grandin, & Enns, 2006; McMillan, 2002; Menor-Campos, Molleda-Carbonell, & Lopez-Rodriguez, 2011). Nevertheless, that does not mean that social contact is always a positive experience: individual characteristics, such as previous experiences, socialization, personality and even genetics play a role on how an individual perceives social contact. In order to be a positive rather the stressful experience, human contact should be positive and consistent (McMillan, 2002).

Again, dogs with good social skills have better chances of being adopted (Belpedio, 2010) as behaviour has a strong influence upon the decision of adopting a dog (Siettou et al., 2014).
A study conducted by Menor-Campos et al. (2011) demonstrated that a 25 minute protocol of exercise, play and human contact was helpful in reducing stress in shelter dogs (Menor-Campos 2011). This is applied research, because there are no guidelines regarding the minimal amount of time that these animals should engage on social activities, so this could be a good starting point for shelters.
It is a fact that many facilities lack enough Human resources to provide daily social enrichment to their animals. That is why shelter managers should decide carefully and rationally its capacity for care. Recruiting volunteers to manage and partake on the enrichment programs is an alternative to put together human resources to guarantee enough social interactions. A structured and well managed voluntary program increases exponentially an organization´s capacity for caring and helping animals, and should be a management priority (Hager, 2014)

8.2.14. Question 59

In regards to the question*: "Do dogs spend quiet time with people regularly?"* shelters D, E and I replied *"Yes - volunteer program",* A and B replied *"Yes - staff are allowed time each day to spend quietly with dogs" (*B even has "chill out rooms, specifically for this purpose), and G replied with both answers (volunteers and staff). These were considered GP. Shelters F and H responded *"Only if staff time allows"*, which is considered as a practice TI. Finally, C responded "*No"*, scored as a RA.

Koret Virtual consultant considers "*quiet time*" as important as time spent in activity for dogs. Knowing how chaotic and stressful the shelter environment can be, it is beneficial for a dog to relax with people. Many shelters already realise the importance of this type of enrichment. For example, Animal Rescue League of Boston divides its enrichment program into three aspects: play, training and quiet time. They found that many dogs struggle to remain calm around people, which may interfere with the transition to a new home when they are adopted (D'Arpino, 2012).

Shelters A and B found creative solutions to simulate home features: they asked for donations of shabby furniture such as sofas and mattresses. Shelter A has a house within its premises, fully equipped like a regular home, so dogs can become accustomed to furniture and to noises of a real life household. This will increase the success of the adoption program; shelter B invested in several indoor and outdoor "*chill rooms*".

8.2.15. Question 60

"Does the shelter have a puppy socialization program for puppies who are housed in the shelter?" shelters A, D, F and G replied *"Yes - staff are allowed time each day to spend socializing with puppies",* E responded *"Yes - volunteer program",* and B responded both (volunteers and staff). All of these answers were considered as GP. Conversely, shelter H responded "*Only if staff time allows*" and I vaguely replied "*depending on the situation"*. Both answers were scored as practices TI. Shelter C replied "*No*", which is a RA.

In order to understand the significance of puppy socialization, it is necessary to keep in mind some important aspects of dog´s ontogeny. One concept that needs to be discussed is the *sensitive period*, defined as "*the period when animals can best benefit from exposure to certain stimuli, and if deprived of such exposure, there is an increased risk of developing problems attendant with the stimulus".* This means that lack of exposure may lead to the development of behavioural problems, but it does not mean that dogs should stop being exposed to stimulus by the end of the sensitive period or even that this exposure is a guarantee that these problems will be prevented. Several stages of the sensitive period are linked to neurodevelopment. For example, during the period between 5-12 weeks, puppies start to interact and seek other species, humans included, and problems associated with this lack of exposure for these stimuli include fear of humans and other species. The period between 10-12 weeks through 16-20 weeks is critical for learning how to explore and to cope with novel environments, but it is also an important period to play, which becomes rougher, and is apparently fundamental for the puppy to learn from mistakes. Problems related to lack of this exposure include neophobia, lack of response diversity and inappropriate or lack of play. It is described that dogs that do not explore new environments by the time they reach 14 weeks will not do it willingly, and if forced to do so, might freeze or become very distressed (Overall, 2013).

While puppies may startle easily, they generally recover quickly, easily accepting new people, other pets, objects, new environments and handling procedures (this is a great opportunity to teach them to be handled in many situations, from grooming to veterinary consults, with the help of positive reinforcement). Some dogs go through a period of fear or heightened sensitivity to fear, around 4 to 6 months, so socialization during this age is strongly advisable. Regarding

the fact that so many dogs are relinquished in shelters due to behaviour problems, it is worth to invest in early puppy socialization as a way of preventing behaviour problems and keeping pets at home (Yin, 2009).

Thus, shelters are advised to give priority to puppy and kitten socialization, if possible outside the shelter, for example in foster homes. Ideally, puppies should meet people of all ages, sexes and races. It is important that puppies enjoy being handled by small children (always with careful supervising), but also by people with strange devices, such as sunglasses, or walking sticks. A practical way to achieve this is by allowing visitors to interact with the puppies in a controlled environment, guarantying that, while at the shelter, puppies socialize with as many people as possible. Exposing puppies to novel environments is a risky practice, especially while they their vaccination program is not completed, and are not allowed full access to the exterior. Shelters may solve this by creating special housing for them, where they are protected from infectious disease, but at the same time enjoy an enriched environment, such as different types of floor (wood, carpet, or even grass) and objects (such as boxes, crates and tunnels); playing CDs with a selection of sounds (thunderstorms, cars, vacuum cleaners and doorbells), or even music is also advised (Schultz, n.d.).

For training handling situations, staff and volunteers may start simulating different features that the dog will probably face sooner or later. Examples include: general handling of different parts of the body such as paws and ears, counterconditioning exercises to put on collars, leads, oral examinations and pill administrations, and grooming (Yin, 2009).

Play-groups may be extremely beneficial for puppy socialization, even though there are some considerations to put in place: while puppies can socialize with others (considering puppies from different litters), they should be monitored to avoid developing bad habits; should be paired with sociable, playful and/or tolerant adult dogs, which are ideal to teach bite inhibition, as well as responsive play behaviour. Fearful, defensive or offensive dogs should be prevented from playing with puppies (Sadler, 2014).

8.2.16. Question 61

For the question *"Are dogs allowed to have supervised interactions with other dogs at the shelter?"* A, B, D, F and I replied "*Yes - in staff-supervised playgroups*", which is considered as a GP. Shelter G and H "*Yes – unsupervised in play yard"*. E does "*a little bit of everything*" (in staff-supervised playgroups, in volunteer-supervised playgroups, and in unsupervised in play yard). "*Unsupervised in play yard*" was considered as a TI practice. Shelter C replied "*No*", considered as a RA.

Behavioural issues associated with lack of social contact with conspecifics may include barking, withdrawal, inactivity and stereotypy (Beerda et al., 1999; Mertens & Unshelm, 1996). However, social contact may increase the risk of infectious disease transmission and injury from fighting (Hubrecht, 1995; Newbury et al., 2010; Wells, 2004a). Thus, compatibility between animals is a significant aspect to consider (Sadler, 2014; Wells, 2004a).

It seems to be very common to house shelter dogs individually in the UK, even though many might be in pairs. Conversely, in Portugal most shelters seem to house dogs in groups, apparently not due to enrichment and behavioural concerns, but due to space constraints. This may cause several problems, as many dogs living in limited space may also lead to aggression and injuries. Therefore, a balance should be found, so social needs among conspecifics can be met.

For dogs living individually, conspecific contact may provide off leash interaction and encourage involuntary activity (Spangenberg, Björklund, & Dahlborn, 2006). While not all conspecific interactions may be equally beneficial, dogs usually engage in social interaction, including play behaviour (Overall & Dyer, 2005).

Play groups are becoming extremely advocated as part of shelter medicine programs. Many shelters (mainly in the USA) are now starting to apply these concepts, and the results are very positive. Sadler (2014), developed a program entitled "*Dogs playing for life* ™". The philosophy behind the project is that through play groups, dogs can "*expend excess of energy in a healthy and interactive way that countered the common anxiety and frustration caused by life in a noisy, uncomfortable and stressful kennel".* Shelters that implemented this program report outcomes such as: increase rate in adoptions; better adoption matches; decrease in length of stay; decrease of noise/arousal levels and of barrier aggression in the kennels; better evaluation of a dog's behaviour, as many dogs who are found to be aggressive toward other dogs when on a leash do well in play groups (Sadler, 2014). So while these outcomes await scientific validation, they represent valuable everyday facts that support play groups.

Because medical and behaviour issues are intertwined, shelters should have medical protocols that allow animals to interact without concerns, namely: up to date vaccination and de-worming of all dogs, daily medical and behavioural rounds, prompt cleaning of faeces in the play yards, efficient record-keeping of play group activities (Sadler & Crawford, 2014).

One question remains to discuss: is it a risk alert to promote unsupervised group plays? As was mentioned already, many dogs in Portugal are group-housed without supervision most of the time. Unfortunately, we cannot address this relevant question properly because there are no published articles or reports, or at least raw data that could be analysed to estimate the frequencies of dog fights and/or disease outbreak in unsupervised play groups. Many variables

will interact and some bias may generate confusion: number of dogs present; familiarity between dogs; neuter status; presence of toys, food and other valuable resources; size of the play yard, and underlying behavioural problems of individual dogs.

For many shelters, the advice of not having unsupervised play groups might lead to quit play groups at all, and that would be unfortunate. This was the reason why the answer "*Yes - unsupervised in play yard*" was scored as a practice TI, and not a RA.

8.2.17. Question 62

Relatively to the question "*When behavioural needs or well-being concerns arise, what is the response"* shelters A and F state that "*a defined behavioural modification or behavioural treatment plan is implemented",* while B and D also provide "*continued, specialized, or expanded enrichment".* Both answers were considered as GP. As for shelters E, G and I, "*staff tries to give a little extra care if they have time".* This was scored as a practice TI. Even though Koret Virtual consultant considers this type of answer as a RA, we decided only to consider a RA when a shelter answered *"No staff time allocated to responding",* which did not happen. Shelter C answered the same, even though sometimes they opt for the following*: "animal is promptly transferred to another agency or foster care situation with resources to provide care",* which was one of the 3 GP options for this question a), b) and e). Finally, shelter H responded that *"a defined behavioural modification or behavioural treatment plan is implemented, but only for some dogs, as we can´t reach all of them",* which will be considered as a practice TI.
Koret virtual consultant considers that "*Responding to some behavioural needs in dogs can be as urgently needed to prevent suffering and as lifesaving in a shelter setting as responding to emergency medical needs."* enhancing once again the importance of behaviour health.

8.2.18. Question 70 [14]

When questioned*: "Are cats provided hiding places in their primary enclosures?"* shelters D, F, G and I replied "*Yes - hiding box",* B does the same, and also provides *"partially covered front of cage"* and *"towel over shelf".* These were all considered as GP. As for shelter E, the answer was *"Yes, for some cats",* that was scored as a practice TI.

Being allowed to hide is considered as an important coping mechanism for cats under stress (Kry & Casey, 2007). Some interesting concerns arise because by providing places to hide, cats will have limited visibility by the public, which could decrease their chances of being

[14] The information provided by the answers to questions nº 63-69 were predictable and/or without the need for in-depth discussion. Therefore, their output was only taken into account on the general discussion descriptive analysis

adopted. However, there is scientific evidence of the positive effect of hiding enrichment on stress levels of cats, showing a drastic stress reduction in enriched cats in comparison to the control group. They also approached humans more often when inside the cage, were found sleeping restfully more often, and no difference was found in adoption rates for cats provided with hiding places (Kry & Casey, 2007; Vinke, Godijn, & van der Leij, 2014).

There are several ways of providing hiding places, even within smaller enclosures. Examples include the Hide, Perch and Go™, developed by Petfinder (USA) and the Feline Fort™ developed by Cats Protection (UK). There are however several inexpensive and disposable alternatives, improvised from shoe boxes and paper bags. An even simpler alternative is draping a towel or blanket over an elevated bed or shelf, creating and hiding place behind the towel.

8.2.19. Question 73

Regarding the question "*Are adult cats provided out of cage time, especially if they stay long-term stay in the shelter?",* shelters D and F replied "*Yes - in an enclosure in the housing room",* and I replied *"They have access to the exterior at all times",* that were considered GP. Shelter B gave three replies. The first two were scored as GP, namely *"Yes - in get acquainted room, and "Yes - in an enclosure in the housing room",* but the third one *"Yes - run around room during cleaning"* was considered as a RA, because it is not advisable to allow animals to run around in the room while cleaning, as debris, litter, hair and other potentially infectious material tends to accumulate, increasing the risk of disease transmission.
Shelters G and E replied "*No*. However, they keep their cats in groups, which allows the animals to have more space and enrichment, thus considered as practices TI.

Out of cage time allows cats to perform a variety of normal behaviours, such as running, jumping, predatory-play behaviour, and also allows for human interaction, such as lap-sitting, having also physical health benefits. Concerns about infectious disease spread can be mitigated with proper vaccination protocols, good sanitation, and daily health and behaviour monitoring of the animals. The rooms chosen for out of cage time should be easy to clean, and the furniture, toys and other enrichment items should be disposable or easy to sanitize If these recommendations are correctly followed, the benefits for behavioural and physical health greatly outweigh the risks (Newbury., 2015).

8.2.20. Question 76 [15]

"Does the shelter have a kitten socialization program?" F replied *"yes - volunteer program",* D replied *"yes- staff are allowed time each day to spend socializing with kittens",* and B and E marked both previous alternatives. Shelter I answered that *"staff and volunteers socialize minimally with kittens in their cages. Kittens leave the shelter very quickly for foster or adoption".* All these were considered as GP. Lastly, shelter G replied *"No",* which is considered as a RA.

The lack of a kitten socialization program is considered by Koret Virtual Consultant as RA. The ASV guidelines consider that socialization is fundamental to help avoid chronic fear, anxiety or difficulty in adjusting to their future living environment (Newbury et al., 2010).

Kittens should be handled by humans as soon as possible. It is established that the *sensitive period* for cats, regarding socialization to humans, is from 2 to 7 weeks old, and the same period seems to apply for socialization with other cats and other species (Landsberg et al., 2012) .Thus, while feral kittens younger than 7 weeks may become sociable if a good socialization program is fulfilled, it is unlikely that 10 week old (or older) kittens, who never contacted with humans, become sociable pets (Bradshaw, 2014).

Time of handling should be gradually increased as the kitten ages. For example, a suggested program for 2 week old kittens may consist of talking to it, gently stroke it and briefly pick it up and cradle in one hand, while a 4 week kitten should be held for two minutes, simulating a physical exam (ears, under the tail) and briefly turning it onto its back (Casey & Bradshaw, 2008). Therefore, shelters should invest in socialization programs, and provide each kitten with a few minutes of interaction daily, if possible, with different people (Bollen, 2015). An adequate socialization seems to be an important factor for cats to remain in their homes, opposite to being relinquished to shelters (Casey et al., 2008).

However, as young kittens are at a high risk of infectious disease in the shelter, litters should be placed in foster homes whenever possible, as it is very difficult to ensure these animal´s physical and behavioural needs without increasing the risk of contracting an infectious disease. When foster care is not an option, nursing queens and kittens should be housed in separate areas far from adult cats and isolation rooms, where sick cats are being treated.

[15] The informations provided by the answer to question nº 71, 72, 74, 75, 77 and 78 were predictable and/or without the need for in-depth discussion. Therefore, their output was only taken into account on the general discussion descriptive analysis

9. Conclusion, limitations and recommendations

9.1. Conclusion

The aim of this study was successfully accomplished, as it was possible to identify several "Good Practices", "Risk Alerts" and practices "To improve", concerning medical and behavioural aspects of animal welfare on this pilot study in 4 UK and 5 Portuguese shelters.

Amongst the 502 different answers collected through the 78 question questionnaire survey, 77.5% were considered GP, 12.6% practices TI and 9.9% RA. Globally, medical health revealed a higher proportion of GP (80.2%) than behavioural health (75.1%). UK shelters showed a higher percentage of GP both in medical (83.8%) and behavioural health (87.1%), than the Portuguese, which scored for GP only 77.4% for medical and 66.7% for behavioural health. Moreover, Portuguese ones also presented 29.5% of practices TI and 3.8% of RA. Behavioural health was the category that most influenced this outcome, pinpointing the need for quick intervention and improvement. However, it must be stated that overall, the proportion of GP was the most rated, both in medical and behavioural health, either in the UK (85.5%) or in Portugal (71.7%), which are encouraging results.

The sample was not representative to allow comparing countries, shelters or to establish any trends. However, it was possible to identify areas for improvement in these individual shelters, and the available final reports may incite shelter managers to take targeted actions to improve the welfare of their sheltered.

This pilot study also highlighted the importance of external assessments, in this case, in the form of a questionnaire. Though this intervention was based upon an USA assessment model, developed for a different culture, mentality, demographic and economical resources, it proved to be a valuable tool to evaluate UK and Portuguese shelters, since minor adjustments are made to fit different realities.

New challenges for shelters will continue to show up. Shelter Medicine is a new field of Veterinary Medicine and the demand for professionals with multidisciplinary competences will continue to increase. The general public is developing an enlightened opinion regarding animal welfare, and new legislation is coming to light concerning companion animal welfare. In Portugal, a new law was approved in August 2016 (DL 27/2016), prohibiting euthanasia as a population control method in municipal shelters, starting on September 2018. This will bring forward many complex welfare issues, as both medical and behavioural health may become compromised due to the growing demand of resources, and consequently, some shelters may not be able to cope with this new very demanding reality. Therefore, tools that are already

available to identify and measure routine practices and quality of live in shelters will be fundamental to assure the “five freedoms” of every single animal living in a shelter.

9.2. Limitations to this study

There were several limitations in this this study. In regards to the questionnaire, although it was very embracing, due to response time constraints some categories had to be given up, for example questions regarding sanitation, which may play a great impact on health and welfare. Even so, the survey was quite large, and it was not possible to measure the time it took to be answered, because as the survey was taking place, several other questions and curiosities would arise, increasing the time spent performing it.

Future studies should aim to work with a representative sample, stratified by shelter’s capacity for care, sheltered species, and public/private purposes.

Another severe limitation of this study was the lack of basic shelter data. While it was possible to gather some data regarding municipal/council shelters, in the UK and Portugal, there are a lot of gaps. For example, there is no data concerning the number of animals accepted in private shelters and respective outcomes. While for municipal shelters it was possible to obtain the proportion of adopted and euthanized animals, it would be important to have complementary data about relinquishment reasons, length of stay and general characteristics of the population. Data collection is critical in order to characterize a problem, and should be a priority of shelter management.

9.3. Recommendations

This pilot study contributed for a more comprehensive understanding of the multifactorial components of Shelter Medicine. After identifying GP and practices considered TI and RA, the author discussed the reasons behind each classification, based upon the latest scientific evidence. Therefore, it was possible to make a list of recommendations, that while not exhaustive, summarizes most of the findings of this questionnaire. To facilitate information checking and reading, the list of specific recommendations was attached in Annexes 6 (medical recommendations), and 7 (behavioural recommendations).

CHAPTER IV – BIBLIOGRAPHY

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ANNEXES

Annex 1. List of Common canine infectious diseases in shelters (adapted from Gingrich & Lappin, 2013; Greene, 2013)

Disease name	Canine Distemper (CDV)	Canine Parvoviral Enteritis (CPV)	Canine Kennel Cough Complex
Etiological agent	*Morbillivirus;* enveloped RNA Virus from the family *Paramyxoviridae*	Canine Parvovirus (CPV-2); noneveloped DNA virus	Several, including CAV-2, canine parainfluenza virus and *Bordotella bronchiseptica*
Susceptible species	Dogs and ferrets	Dogs. Can cause clinical signs in cats, though rarely.	Dogs are the primarily susceptible species
Zoonotic?	No	No	*Bordetella bronchiseptica* may occasionally infect people
Clinical signs	Respiratory signs (nasal and ocular discharge, may progress to pneumonia); GI signs (vomiting, diarrhoea), lethargy, inappetence; Neurological signs (e.g. ataxia, seizures, twitching)	Vomiting, severe diarrhoea, often with blood; innapetence. Usually animals develop extreme lethargy and dehydration. Leukopenia is a common finding in laboratory analysis.	conjunctivitis, ocular and nasal discharge, sneezing and cough, with variable severity. Some patients present with tracheal sensitivity when palpated
Mode of transmission	Direct or indirect contact (fomites) with contaminated secretions, but particularly through aerosol or droplet exposure. Viral shedding after 1 week of infection.	Highly contagious. Transmission through direct or indirect contact of contaminated faeces. Fomites are a significant contributor for spreading the virus in the shelter. Dogs may carry the virus on their fur for extended periods of time, and should be bathed after recovery.	Mainly by aerosols, but may be transmitted by direct contact and through fomites.
Excreted in	Body secretions such as faeces and urine, but specially respiratory secretions	Faeces mainly, but also vomit and other secretions	Mainly through aerosols released through coughing and nasal discharges
Incubation period	First clinical signs appear from less than 2 weeks to 6 weeks post-infection.	Usually 4 to 6 days. But may go up to 10 to 14 days.	May range from 2 to 14 days, depending on the pathogen
Diagnostic tests	RT -PCR, IFA, IHC and Serology (IgM and IgG)	In-house ELISA faecal antigen test + clinical signs + WBC counts	PCR, serology, culture (for diagnosing *B. bronchiseptica)*

Prevention and control	Vaccination of all dogs with MLV vaccines on intake. Disease surveillance through monitoring and good sanitation, quarantine and isolation protocols	Vaccination of all dogs with MLV vaccines on intake. Disease surveillance through monitoring and good sanitation and quarantine and isolation protocols	Vaccination against canine parainfluenza and *Bordetella bronchiseptica* may not prevent disease, but help mitigate clinical signs. Isolation of suspected animals, overcrowding avoidance and stress reduction are also important
Disinfection	Routine disinfection procedures are usually effective in destroying CDV. Virus is not resistance in dry and warm environments.	The virus is extremely stable and resistant even in adverse environments. Effective disinfectants include sodium hypochlorite 1:32 and potassium peroxymonosulfate.	Routine disinfection is usually effective for destroying most pathogens involved. A sodium hypochlorite dilution in water of 1.32 may be used if CAV-2 is involved. Surfaces should be thoroughly dried after rinsing
Post recovery shedding	Typically sheds for 2 weeks post-infection, but can go to 16 weeks (uncommon)	Usually less than 2 weeks.	Most viral pathogens less than 2 weeks. *B.bronchiseptica* up for 3 months
Treatment	Supportive care and antibiotics for secondary infections	Mainly supportive care and antibiotics for secondary infections	Supportive care in most cases. Antibiotics mostly reserved if *B. bronchiseptica* or other bacterial agents are present
Carrier state?	No. However, old dog encephalitis (ODE) has been described, due to progressive neurologic disease induced initially by CDV.	No.	No for most agents. However, healthy dogs may serve as carriers of *B. bronchiseptica.*
Observations	Subclinical infections are common and these animals shed virus to the environment.	Virus may remain viable for months to years, especially in dark and moist environments. Attention to grass and dirt play yards contamination.	Very easily spread in shelters, with high morbidity but generally much lower mortality. Prognosis for uncomplicated CKC is good

Annex 2. List of Common feline infectious diseases in shelters (adapted from Gingrich&Lappin, 2013; Greene, 2013)

Disease name	Panleukopenia (FPV)	Feline Upper Respiratory Infection (URI)	Feline Immunodeficiency (FIV)	Feline Leukemia (FeLV)
Etiological agent	Feline Parvovirus; nonenveloped DNA	Mostly caused by Felines Herpesvirus (FHV-1) and Feline calicivirus (FCV). Sometimes in association with *Chlamydophila felis, B.bronchiseptica* and *Mycoplasma spp.*	Feline Immunodeficiency virus; lentivirus, *Retroviridae*	Feline leukemia virus ; oncornavirus, *Retroviridae*
Susceptible species	Cats, commonly young unvaccinated kittens	Cats (FHV-1 and FCV)	Cats	Cats
Zoonotic potential	No	No (FHV-1 and FCV)	No	No
Clinical signs	Fever, letargy, vomiting, diahorrea leading to dehydratation, and leukopenia is very common, and severely affected kittens may die within 12 hours.	Sneezing, nasal and ocular discharges, (FCV, FHV - 1 and *B. bronchiseptica* Infections); Oral ulceration Usually FCV but also FHV-1); a highly pathogenic strain of FCV has been described (viral systemic FCV) causing vasculitis, fever and dyspnea. Conjunctivitis associated with FHV-1 and *C. felis.*	No typical clinical signs. anemia, chronic infl ammatory conditions such as stomatitis, neoplasia, and opportunistic secondary infections are common signs of chronic retroviral infection.	Also non-specific. Leukemia is the most common syndrome associated with FeLV infection.
Mode of transmission	Direct contact, but fomite also very important in transmission.	Fomites and cat-cat transmission. Aerosol transmission mainly important for house group living.	major mode of transmission is through bite wounds. May be transmitted by fomites, during invasive procedures or by blood transfusions (the same for FeLV).	It is required close contact between cats to have transmission. The virus can be transmitted through the oronasal route by nursing, mutual grooming, sharing of dishes, and also through bites.
Excreted in	All secretions.	Ocular, nasal and oral secretions.	Saliva and milk.	Saliva, nasal secretions, faeces, urine and milk.
Diagnostic tests	Presumptive diagnostic in presence of clinical signs+leukopenia; parvo ELISA SNAP test	Shelters seldom use diagnostic tests. Diagnostic mostly presumptive by clinical signs.	ELISA, for detection of antibodies (persistent, lifelong infection permits the detection of antibodies in peripheral blood); PCR.	ELISA for viral antigen detection , preferably using serum or plasma , immunofluorescent antibody (IFA) and PCR.

Prevention and control	Vaccination with MLV; strict isolation of affected animals.	Vaccination with MLV for FHV-1 and FCV does not prevent infection but lessen the severity of clinical signs. Isolation of affected animals.	Infected animals should be housed individually in the shelter (same for FeLV).	Vaccine is considered non-core but may be opted for in some circumstances.
Disinfection	Similarly to dog parvovirus, FPV is extremely resistant in environment. Effective disinfectants include sodium hypochlorite 1:32 and potassium peroxymonosulfate.	FCV is nonenveloped and the most difficult to eliminate. Effective disinfectants include sodium hypochlorite 1:32 and potassium peroxymonosulfate.	Common disinfectants are effective in eliminating both FIV and FeLV virus, as there are unstable outside their hosts	
Incubation period	Usually 5 to 7 days, but can vary from 2 to 10 days and go as long as 14 days	1 to 6 days (for the viral Pathogens)	. Lifelong infection	Lifelong infection
Post recovery shedding	Virus may be found in faeces and urine up to 6 weeks post recovery	Variable.	FIV infections usually remain viremic and infectious to other cats for life	FeLV may or may not remain viremic. If not, it is unlikely to transmit virus
Treatment	Supportive care, including fluid therapy, antimicrobial therapy and nursing care.	Supportive care and antimicrobial therapy if secondary bacterial infection is suspected (e.g, presence of purulent ocular or nasal discharges).	Not specific. Treatment is aimed at clinical signs of secondary infections. Interferon.	Not specific. Treatment is aimed at clinical signs of secondary infections. Like in FIV. Interferon therapy may be considered for some cases.
Carrier state?	Not proven	Yes. agents can also infect and be shed by cats who never display clinical signs	Yes	Yes
Observations	The disease typically has an explosive short course and high case fatality rates	Stress reduction is very important to decrease cat´s susceptibility to developing URI.	Cats may life for several years without signs of secondary infection.	Shelters may decide to only test high risk animals (FIV ,FeLV)or when group housing is an option.

Annex 3. Suggested vaccination protocol for shelters (adapted from Larson, Newbury & Schultz, 2009)

Species/age group	Core vaccines	Timing for 1st vaccination	Revaccination	Comments
Adult dogs	Parenteral MLV for CDV, CPV-2, CAV-2, with or without Canine parainfluenza.	On intake or prior if possible.	Revaccinate at 1 year of age then revaccinate every 3 years ; a boost is reccomended 2-4 weeks later, specialy for dogs who were ill or injured at the time of the first vaccine.	While not considered core by the international guidelines, most vaccines in the Uk and Portugal include protection against *Leptospira spp* (need to revaccinate annulay).
Puppies	Parenteral MLV for CDV, CPV-2, CAV-2, with or without Canine parainfluenza.	On intake or when they reach 4-6 weeks of age.	Every 2-3 weeks until at least 16 weeks of age.	Some guidelines indicate until 18 weeks of age. Prelonged vaccination is ameasure to try to overcome the possible presence of MDA.
All adults and puppies	Intranasal MLV vacine for B. bronchiseptica and canine parainfluenza virus.	On intake or prior if possible.	For dogs <6 wk of age,an additional dose is recommended At a minimum interval of 2 weeks; for adults, every 6-12 months .	The onset of protective immunity after initial IN vaccination occurs within 72 hoursr; this vaccine can reduce the severity of disease but will not entirely prevent disease.

				This intranasal vaccine cannot be given by parenteral route.
Adult Cats	Parenteral MLV vaccine for FPV, FHV-1 and FCV.	On intake or prior of possible.	Boost after 2 weeks but a single dose is usually provides sufficient immunization.	While vaccine prevents disease for FPV, it only helps reducing severity of disease for FHV-1 and FCV.
Kittens	Parenteral MLV vaccine for FPV, FHV-1 and FCV.	On intake or when they reach 4-6 weeks of age.	Revaccinate every 2–3 weeks until 16–20 weeks of age.	

Annex 4. Ethogram of behaviours associated with poor welfare in kenneled dogs (adapted from Stephen & Ledger, 2005)

Behaviour	Description
➢ **Repetitive pace**	➢ Dog repeatedly (> 3) paces around kennel in a fixed route.
➢ **Wall bouncing**	➢ Dog repeatedly (> 3) jumps up kennel wall from side to side
➢ **Tail-chasing**	➢ Dog chases tail repeatedly (> 3) for reasons other than discomfort or grooming.
➢ **Circling**	➢ Dog walks around in small circle repeatedly (> 3).
➢ **Play bouncing**	➢ Dog repeatedly displays the play bow posture (>3) and may bark repeatedly.
➢ **Chewing bedding**	➢ Dog chews its own bedding
➢ **Chewing bars**	➢ Dog repeatedly chews and bites at the wire of the kennel (> 20 sec).
➢ **Self-licking**	➢ Dog licks or chews its own body repeatedly (> 5 minutes per session).
➢ **Polydipsia**	➢ Dog drinks large volumes of water in excess of what is normal.
➢ **Panting**	➢ Dog pants for reasons other than physical exertion or a warm ambient temperature (only recorded if temperature is < 25°).
➢ **Lack of appetite**	➢ Dog does not eat more than 50% of the food that is presented.
➢ **Excessive vocalization**	➢ Dog barks for prolonged periods (> 1 min) in the visual and auditory absence of people and other dogs
➢ **Listless**	➢ Dog is withdrawn and unresponsive to commands.
➢ **Escape attempt**	➢ Dog attempts to escape kennel in a forceful manner whenever the kennel door is opened and closed.
➢ **Hiding**	➢ Dog is obscured from the view of kennel staff behind its bed or other kennel furniture for prolonged periods when not asleep (> 2 min); may be accompanied by a low posture and trembling

Annex 5. Questionnaire

School of Veterinary Medicine and Science

Medical and Behavioural Health Survey for Shelters

Name of the shelter: _____
Location: _____
Species cared for (Dog/Cat/ Farm/Others): _____
Intake Policy: _____
Animal capacity for all species*:* _____
Full Time Vet: Yes/No **Vet Unit at the shelter**: Yes/No
Trainer/Behaviorist: Yes/No **Training/Exercise facilities**: Yes/No

Members of Staff:
Vets: ___
Vet nurses ___
Care givers ___
Management/Admin ___
Trainers/Behaviorist ___
Office staff ___
Others ___

Average number of volunteers in total: ___
Average number of intake per year: Dogs ___ Cats ___
Proportion of the following outcomes: ___

Dogs: reclaim ___ rehome ___ euthanasia ___other ___
Cats: reclaim ___ rehome ___ euthanasia ___other ___
Average time of stay in the shelter: Dogs ___ Cats ___

Medical Health and Physical Well Being

General

1- Does the shelter have a veterinary program? Yes/No

2 - If so, what does it include?

a) Health check on intake ___
b) Preventive care (vaccines, deworming endo and ectoparasites) ___
c) Diagnosis ___
d) Treatment ___
e) N/A ___
f) Other ___
g) All of the above options___

Health Exam

3 - Are all animals systematically examined by trained staff at or around the time of intake?

a) Yes
b) No
c) N/A

4 - **After intake, when are animals routinely re-examined?**

a) Only before being made available for adoption
b) Before any change in status or change of housing area
c) Before going to foster
d) No exam after intake
e) Only if problems are noted
f) N/A
g) Other

5 - How is physical examination findings recorded?

a) Clearly written in a paper medical record
b) Entered into an electronic database
c) Using a medical record that is either written or electronic
d) Findings are not recorded unless a problem is noted
e) Not recorded
f) N/A
g) Other

6 - Which hygiene methods are in place when performing clinical exams between animals?

a) Hands sanitized with water and soap
b) Hands sanitized with gel/sanitizing solutions
c) Disposable gloves when handling animals with suspected or confirmed infectious disease
d) Surfaces disinfected
e) N/A
f) All of the above
g) None of the above
h) other

Vaccines

7 - Are dogs at the shelter vaccinated at all? Yes/No

8 - Which dogs are vaccinated with core vaccines?

a) All animals: ___
b) Some animals. (Which ones?): ___
c) Animals which are adopted: ___
d) Other: ___

9 – When takes place dog vaccination?

a) Immediately after intake
b) Within 24 hours of intake
c) At the next vet visit.
d) Before it comes into the shelter.
e) When it is booked to be adopted.
f) Other

10 - At what age are puppies vaccinated (1st dose)**?** _____

11 - How often are they being vaccinated? _____ weeks
12 - For how long are they vaccinated? _____ weeks

13 - Which diseases are included in the protocol for puppies?

a) Distemper ___
b) Parvovirosis ___
c) Leptospirosis ___
d) Canine Adenovirus ___
e) Canine Parainfluenza ___
f) Other? _____

14 - How often do you diagnostic parvovirus?

a) Daily
b) Weekly
c) Monthly
d) Every few months
e) Very rarely
f) Never

15 - How often do you diagnostic distemper, in both puppies and adults?

g) Daily
h) Weekly
i) Monthly
j) Every few months
k) Very rarely
l) Never

16 - Are cats at the shelter vaccinated at all? Yes/No

17 - Which cats are vaccinated with core vaccines?

a) All animals ___
b) Some animals. Which ones? ___
c) Animals which are adopted ___
d) Other ___

18 - When/ If an cat is vaccinated when does this occur?

g) Immediately after intake
h) Within 24 hours of intake
i) At the next vet visit.
j) Before it comes into the shelter.
k) When it is booked to be adopted.
l) Other

19 – At what age are kittens being vaccinated?

20 - How often are they being vaccinated? (in terms of weeks)

21- For how long are they vaccinated? (in terms of weeks)

22- Which disease are included in the protocol for kittens?

g) Feline herpesvirus ___
h) Feline calicivírus ___
i) Feline Panleukopenia ___
j) FeLV ___
k) Other? _____

23- How often do you see panleukopenia?

a) Daily
b) Weekly
c) Monthly
d) Every few months
e) Very rarely
f) Never

24 - How often do you see *Cat Flu* (calicivirus and herpesvirus) both in kittens and adults?

a) Daily
b) Weekly
c) Monthly
d) Every few months
e) Very rarely
f) Never

Parasites

25 - is there a parasite control protocol in place?

a) Yes
b) No
c) N/A

26 –when do animals receive treatment for internal parasites?

a) Routinely for all animals.
-how often? _____
b) When they have an obvious internal parasite infection
c) Only when they enter the shelter
d) N/A
e) Other

27- when do animals receive treatment for external parasites?

a) Routinely for all animals
-how often?_____
b) When they have an obvious internal parasite infection
c) Only when they enter the shelter
d) N/A
e) Other

Monitoring and Response to disease and illness

28- Are daily observations of health and behavioral well-being monitored and registered by staff?

a) Yes
b) No
c) N/A
d) Other

29 - Are animals ever group housed? Yes/No

30- If yes, what special considerations are made when monitoring health of animals in groups?
If the answer is “none” it should be considered as risk alert (view Koret in “monitoring”)

31-Are staff provided with training and written instructions identifying conditions warranting immediate behavioral intervention? (eg food-related aggression)
a) yes
b) no
c) N/A
d) Other

32-**Are staff provided with training and written instructions identifying conditions warranting immediate veterinary attention?**
a) Yes
b) No
c) N/A
d) other

33-**Are staff trained specifically to watch for and respond to suspected zoonoses or infectious problems that could pose an immediate risk to the population (e.g. parvovirus or ringworm)**
a) Yes
b) No
c) N/A
d) other

34-If there is an emergency out of hours (no vet in the shelter), how quickly do they see the vet?
a) animals are taken immediately to vet
b) we phone the vet for instructions immediately
c) We phone the vet for instructions the next day
d) we wait for the next vet visit
e) N/A
f) other

35-Are sick and injured animals monitored daily by trained medical staff?
a) Yes
b) No
c) N/A
d) other

36 –What is the protocol for animals with suspected infectious disease?
a) they go to the isolation block
b) they are isolated, but we don´t have a specific isolation block
c) animals are not isolated
d) N/A
e) Other (e.g. foster care, euthanasia..)

Medical treatment

37-are those providing treatment have the necessary training, skills and resources to ensure treatment is administered correctly and safely?
a) Yes
b) No
c) N/A
d) other

38-Does the Shelter have a clear policy for handling disease problems that may develop after adoption?

a) Yes
b) No
c) N/a
d) other

39- and are the adopters informed about the presence of any disease or condition known to be present at the time of adoption and provided a copy of any treatment records.

a) Yes
a. If so, how?
b) No
c) N/A
d) other

Spay/neuter

40 -Does the shelter have a policy for spaying and neuter the animals in its care, either while they are in the shelter, or after adoption? (by giving vouchers for example)

a) Yes
b) No
c) N/A

41 -If yes, what is the policy?

Each answer will have to be analyzed individually

42-at what age do you star neutering?

43-Are shelter animals allowed to breed?

a) Yes
b) No
c) N/A

Behavioural Health

General

44- Are staff trained to recognize body language and other behaviors that indicate animal stress, pain and suffering as well as those that indicate successful adaptation to the shelter environment?

a) Yes
b) No
c) N/A
d) other

45-Does the assessment of an animal's behaviour begins at the time of intake?

a) Yes
b) No
c) N/A
d) other

46-Does the staff performing behavior evaluations receive adequate training in performance, interpretation and safety?

a) Yes
b) No
c) N/A
d) other

47-Are the training methods primarily based on positive reinforcement in accordance with current professional guidelines?

a) Yes
b) No
c) N/A
d) Don´t know
e) other

48-Does any animal which is observed to be experiencing mental suffering, distress or behavioral deterioration assessed and appropriately treated in a timely manner, or humanely euthanized?

a) Yes
b) Only whenever possible
c) N/A
d) other

49-what happens to feral or aggressive animals, who cannot be provided with basic care, daily enrichment and exercise without inducing stress?

a) long term confinement
b) foster
c) euthanasia
d) other
e) N/A

Dogs

50-Is a behavioral history obtained from owners or finders at time of surrender?

a) Yes - via a form
b) Yes - verbally
c) Yes - owners / finders complete a form electronically
d) Some of the time
e) No
f) N/A
g) other

51-How is a dog's behavior and mental well-being monitored during their shelter stay?

a) It is not monitored
b) When staff / volunteers notice something it's brought to staff's attention
c) Through systematic daily monitoring
d) N/A
e) Other

52-Are dogs given beds in their kennels?

a) Yes - all dogs
b) Yes - only if shy
c) No
d) N/A

53-Are dogs given a place to hide in their kennels?

a) Yes - only if shy
b) No
c) Yes - all dogs
d) N/A

54-Does the shelter have an enrichment program for dogs?

a) Yes - we are proud of the level of enrichment we provide
b) Yes - we are even providing behavior modification and training
c) Yes - but we would like to do more
d) No
e) N/A

55- If yes, please give some examples

56-Are dogs given toys and other in-kennel enrichment at the shelter?

a) Yes - when staff time allows
b) No
c) Yes - every day
d) Yes - Novel toy rotation program allows animals to have a new toy each day
e) N/A
f) Other

57-Does the shelter use feeding as an enrichment opportunity?

a) Yes
b) No
c) N/A
d) Other

58-Do adult dogs have opportunities for positive interactions with people outside of daily routines such as cleaning and feeding?

a) Yes - volunteer program
b) Only if staff time allows
c) No
d) Yes - staff are allowed time each day to have quality time with dogs
e) N/A
f) Other

59-Do dogs spend quiet time with people regularly?

a) No
b) Only if staff time allows
c) Yes - volunteer program
d) Yes - staff are allowed time each day to spend quietly with dogs
e) N/A
f) other

60-Does the shelter have a puppy socialization program for puppies who are housed in the shelter?

a) Yes - volunteer program
b) Yes - staff are allowed time each day to spend socializing with puppies
c) Only if staff time allows
d) No
e) N/A
f) Other

61-Are dogs allowed to have supervised interactions with other dogs at the shelter?

a) Yes - in staff-supervised playgroups
b) Yes - in volunteer-supervised playgroups
c) Yes - unsupervised in play yard
d) Yes - but only during adoption meet & greets
e) No
f) N/A
g) Other

62-When behavioral needs or well-being concerns arise, what is the response?

a) A defined behavioral modification or behavioral treatment plan is implemented
b) Continued, specialized, or expanded enrichment is provided
c) No staff time allocated to responding
d) Staff try to give a little extra care if they have time
e) Animal is promptly transferred to another agency or foster care situation with resources to provide care
f) N/A
g) Other

63-Is dog behavior evaluated in the shelter prior to adoption?

a) No
b) Yes - using a standardized or formalized evaluation
c) Yes - using an evaluation the shelter created
d) Yes - using just observations and behavioral history
e) N/A

64-How is information from behavioral evaluation used?

a) To make transfer decisions
b) To initiate behavioral treatment or behavioral modification programs
c) To help with pet matching or create adoption criteria
d) To help make care and management decisions
e) All of the above
f) Behavioral information is not utilized
g) N/A
h) Other

Cats

65-Does the shelter have a structured program to support feline behavior and provide enrichment?

a) Yes - proud of the level of enrichment provided
b) Yes - behavior modification and training is also provided
c) Yes - but would like to do more
d) No
e) N/A

66-Is a behavior history obtained from an owner at time of surrender?

a) Yes - on a form
b) Yes - electronically
c) Yes - verbally
d) No
e) N/A

67-What is done to reduce stress for cats at intake?

a) Separate intake room from dogs
b) Carried covered by a towel
c) Carried in a carrier/box that stays with the cat
d) All of the above
e) None of the above
f) N/A
g) Other

68-How many compartments does each cat housing unit have in the shelter?

a) One
b) Two
c) Three
d) Cats are housed in groups in rooms
e) Some are double, some single
f) N/A
g) Other

69-Are cats given beds in their primary enclosures?

a) Yes - elevated beds to all cats
b) Yes - blankets to all cats
c) Yes - elevated beds and blankets to all cats
d) Yes - old cats only
e) No
f) N/A
g) Other

70-Are cats provided hiding places in their primary enclosures?

a) Yes - partially covered front of cage
b) Yes - hiding box (shoe box, Hide, Perch & Go, etc.)
c) Yes - towel over shelf
d) No
e) N/A
f) Other

71-Are cats given the opportunity to scratch in their primary enclosures?

a) Yes - all cats
b) Yes - only "stressed" cats
c) No
d) N/A

72-Are cats given toys in their primary enclosure?

a) Yes - changed out daily
b) Yes - changed out with a new cat
c) No
d) N/A
e) Other

73-Are adult cats provided out of cage time, especially if they stay long-term stay in the shelter?

a) Yes - in get acquainted room
b) Yes - in an enclosure in the housing room
c) Yes - run around room during cleaning
d) No
e) N/A
f) Other

74-Is the public allowed to interact with cats in their housing units on the adoption floor?

a) Yes
b) No
c) N/A
d) Other

75-How is a cat's behavior and mental well-being monitored during their shelter stay?

a) Behavior is not monitored
b) When staff/volunteers notice something wrong, it's brought to staff's attention
c) Through structured daily monitoring
d) N/A
e) other

76-Does the shelter have a kitten socialization program for kittens in the shelter?

a) Only if staff time allows
b) No
c) Yes - volunteer program
d) Yes - staff are allowed time each day to spend socializing with kittens
e) Staff and volunteers socialize minimally with kittens in their cages. Kittens leave the shelter very quickly for foster or adoption.
f) N/A
g) Other

77-Does the shelter use feeding as an enrichment opportunity?

a) Yes. Canned food is fed for enrichment daily in addition to dry food in bowls
b) Dry food is fed in food dispensing toys and canned food is fed in bowls
c) Measured amount of canned and dry are fed twice daily
d) Only dry food is fed, filled once each day when cage is cleaned
e) N/A
f) Other

78-How is cat behavior evaluated in the shelter?

a) Using a researched, systematic evaluation
b) Using an evaluation the shelter created
c) Using observations and reports from history
d) Not evaluated
e) N/A
f) Other

Thank you very much for your time

Annex 6. Medical Health Recommendations

General considerations and health exam
➢ Shelters are advised to have a structured veterinary program, that at a minimum, should include: health check on intake, preventive care (vaccination and parasite control), diagnosis and treatment, which is provided by trained staff. ➢ A health check on intake will permit to identify injuries warranting immediate veterinary assistance, signs of infectious disease, and microchip scanning. ➢ After intake, animals should be routinely re-examined, specially long-term stay animals, in order to detect changes in health status, that could otherwise pass unnoticed ➢ All physical examination findings should be recorded, so all staff may have access to the information ➢ Hygiene methods should be in place when performing clinical exams between animals, in order to reduce the spread of potential infectious disease, as people are one of the most important fomites contributing to infectious disease spread in the shelter environment. These methods should include: hands washing; hand sanitizer; disposable gloves for handling suspect/confirmed animals with infectious disease; surfaces disinfected.

Vaccination
➢ Shelters are advised to vaccinate all animals with core vaccines on intake. Vaccines are extremely important to prevent some seriously severe infectious disease, thus, every animal, including pregnant or mildly ill or injured animals should be vaccinated, as the benefits outweigh the risks. ➢ Modified live vaccines (MLV) should be preferred instead of inactivated ones. ➢ Puppies and kittens should start their vaccination program at 4-6 weeks of age, and every 2-3 weeks until at least 16 weeks of age, in order to increase the chances of overcoming Maternal Derived Antibodies (MDAs) and become properly immunized. ➢ These practices may represent great financial challenges. However, shelters should recognise that by vaccinating all animals, they are allowed to prevent serious disease, which can put animal's lives in risk and represent an enormous financial burden for the shelter in case of disease, or even outbreak situations.

Parasite control

- Shelters are advised to have parasite control protocols in place, based on the most common parasites affecting its geographical area.
- As general rule guidelines, animals should be treated on intake for internal parasites with a broad-spectrum anthelmintic, such as Fenbendazole, or a combination of Pyrantel + Praziquantel + Febental (Drontal Plus®). External parasite control should also take place on intake, and there are many options available, depending on the parasites that a shelter needs prevention for.
- Routine parasite control is also advised. However, this represents a great financial burden for shelters. Therefore, the routine should be individually planed, depending on the shelter, its geographical setting, and financial resources.
- Shelters may also decide on parasite control options depending on the individual animals. As an example, for animals identified as short-term stays (such as puppies, kittens and young healthy animals) external parasite control with monthly spot-on might be better suited, while for a long-term stay animal, an insecticide collar (such as Scalibor® or Seresto®) which is more expensive but may have effect for months, may be a better option.

Monitoring and response to disease and illness

- In order to ensure that changes in physical or behavioural health are promptly answered, it is very important that daily observations are made and registered. This will permit a clearer communication between staff.
- Shelters may use simple daily monitoring sheet for each animal. Examples of what could be included: faeces and urine output, presence of vomit, appetite and behavioural observations. Samples of daily monitoring sheets can be obtaining here: http://www.sheltermedicine.com/library/instructions-for-daily-monitoring-of-animal-health-and-behavior.
- While time consuming, this daily monitoring task can help identify serious problems, preventing medical or behavioural issues of becoming more serious problems.
- For group housed animals, special considerations for monitoring should be in place. These include: food intake and around food, monthly or routinely body weighing and body condition scoring, especially for long-term stay animals. A physical exam should be performed to all co-housed animals when in the presence of vomit, diarrhoea, abnormal urine or mucus, in order to help identify the affected animal.
- Staff should be provided with basic training and written instructions to identify conditions that may warrant immediate veterinary intervention. People might get confused on how to proceed in such stressful situations, thus having access to instructions on how to approach situations of emergency might have a great impact in the outcome of the situation. Instructions should also include on how to proceed if there is an emergency out of hours and there is no veterinarian available in the premises.
- Whenever possible, sick and injured animals that stay on the shelter, should be monitored by trained medical staff.
- Basic training and written instructions to identify conditions that may warrant behavioural intervention, such as situations of extreme fear, stress and aggression should also be provided.
- Staff should also be trained to watch for and respond to suspected zoonosis or infectious disease, which could pose a risk to people or to the rest of the animal population.
- Animals suspected/confirmed of infectious disease should be physically isolated from the remaining population, if possible, in specific isolation blocks.

Medical treatment

- Those providing treatment to sick or injured animals should have the necessary skills, training and resources, to ensure that the treatment is administered correctly and safely
- Shelters should have clear policies on how to handle disease problems that may develop after adoption. For example, some shelters chose to offer medical follow-up in the first month after adoption; others develop assistance problems for animals with chronic disease, where they continue to support the animal´s treatment and veterinary assistance, as this will allow increasing the chances of these animals finding a home.
- Adopters should always be informed of the presence of any disease or condition known to be present at the time of adoption, and provided with a copy of treatment records or other important information.

Spaying and neutering

- Shelters should have policies for spaying and neutering animals in their care, while at the shelter, or after adoption, if before is not a possibility. Neutering is a very important tool for population control. Giving for adoption sexual intact animals may contribute to the animal overpopulation problem, and consequently, increase the number of shelter intake and euthanasia. Shelter animals should never be allowed to breed in any circumstance.
- Spaying and neutering may represent a great financial burden for many shelters, but like vaccinations, this should also be a shelter´s priority, and funds should be collected and reserved according to the shelter´s necessity. Not every shelter has the chance of having a veterinary on site, and/or proper infrastructures to have surgery on its premises. Therefore, they may seek to establish protocols with other public of private identities, such as private practices, veterinary teaching hospitals and municipal councils.
- Early neutering could start to become an option for some shelters, especially those who face great challenges of animal overpopulation in their community, receive to many young animals (<6 months of age), or find that adopters of puppies and kittens are not compliant with drawn contracts to have the animals neutered after 6 months, even though many shelters provide this service for free.

Annex 7. Behavioural Health Recommendations

General recommendations
➢ Staff should be trained to recognize body language and behaviours that indicate animal stress, pain or suffering, as well as those that indicate successful adaptation to the shelter. There are several educational tools that can be accessed on the internet, and for those shelters unable to contract a trainer or behaviourist, protocols could be arranged with these professional, so staff can receive basic training in behaviour. ➢ Shelters are advised to obtain a behavioural history from owners or finders at the time of surrender to the shelter, as detailed as possible. This information will allow identifying individual needs and characteristics that may help the behavioural management of individuals in the shelter. ➢ The assessment of an animal's behaviour should begin at the time of intake, conducted by staff trained to evaluate and perform the assessment. Some shelters might choose standardized evaluations, while others prefer to make their own evaluation, or simply rely on individual animal´s observations. ➢ Behavioural evaluation by be used for several different things: first most, to help with care and management decisions; to help with pet matching for adoption purposes; to initiate behavioural treatment or behaviour modification programs, and to make transfer or fostering decisions. some shelters use this evaluations to make euthanasia decisions, when other options for the animal are unavailable. ➢ Shelters are advised to have a structured puppy/ kitten socialization program, as puppyhood/kittenhood is a crucial moment in life to learn new experiences, overcome fears and socialize with people and other animals. Thus, many future behavioural problems may be prevented by allowing puppies and kittens to have sage experiences, which ca be obtained with the help of volunteers. ➢ Whenever an animal is observed to be experiencing mental suffering, distress or behavioural deterioration, it should be assessed and treated appropriately in a timely manner. If it is not possible, humane euthanasia should be an option. ➢ Long term confinement should not be an option for feral or aggressive animals, whose basic care, daily enrichment and exercise without inducing stress. Other options should be considered, such as foster homes, TRN programs for feral cats, and in some situations, humane euthanasia.

Dogs

- All dogs should be give bends/bedding in their primary enclosures, as they provide comfort, thermoregulation and protection of the skin and musculoskeletal system.
- Dogs should also be given a place to hide, as the choice to retreat and a sense of control is very important to their welfare. Some primary enclosures will already be able to provide this due to the way they are built. Other ways to provide places to hide for dogs include plastic/wood dog houses, carriers, plastic boxes properly adapted. Some more ideas can be seen on this link http://www.sheltermedicine.com/library/sit-stay-retreat-enrichment-ideas-for-dog-housing-in-shelters.
- An enrichment program for dogs is fundamental and should not be considered optional. Social and mental stimulation, as well as physical exercise are essential to maintain an individual´s health. A thorough enrichment program may be very challenging without the help of volunteers, which have a very important role in practically all shelter's activities. Thus, shelters would be advised to have a structured volunteer program that would allow for a wide variety of activities.
- Social enrichment may include time spent with people (walks, training, quiet time), and with other dogs, such as supervised play groups. Some of these activities are able to fulfil both physical and social needs.
- Examples of enrichment for mental stimulation include training, toys, scent games and feeding enrichment. There are several resources on how to make unexpansive toys, including food dispensing toys.
- As dogs may lose interest in toys, it is advisable to have a toy novelty rotation program. More on how to build toys through these links**:** http://www.sheltermedicine.com/library/pvc-food-dispensing-toy-how-to-make; http://www.aspcapro.org/resource/saving-lives-behavior-enrichment/make-meal-time-enriching; http://www.animalfarmfoundation.org/pages/Creative-Outlets.
- Examples of enrichment for physical stimulation include walks, play groups or individual play with people in fenced areas, interactive exercises with balls and other toys. Unfortunately, not all shelters are able to provide safe, fenced areas for dogs, so walks with the dogs may be an alternative, as these only require good material (collars, harnesses and leads), which can be donated, and volunteers (proper volunteer programs are advised).

Cats

- Intake is often a very stressful event for a cat. In order to reduce it, several simple steps could be implemented, as advised: cat´s intake separated from dogs; carrier should be covered by a towel/blanket; carrier should stay with the cat on its primary enclosure.
- It is strongly beneficial to have two-compartment housing. This allows to physically separate areas of resting and eating from elimination areas, it will also allow cleaning and disinfection to be more efficient.
- As for dogs, shelters should also have a structured program to support behavioural health and enrichment for felines.
- Enrichment components for cats might include: beds for all cats, if possible, elevated, or at least, provision of elevated places, as cats likes to perch in high places. Depending on the primary enclosure, this might be obtained with PVC elevated beds, shelves on the walls and cat's towers (either bought or handmade).
- Provision of hiding places is also extremely important for cats. This can be very easily accomplished by putting cardboard boxes, or any other type of boxes inside the enclosure, or by partially covering the front of the cage with a towel.
- Scratching is a very important behaviour for cats, so all should be given the opportunity to scratch. Commercial scratching pads available, but handmade options can be very cost-effective. Examples include stripling pieces of carpet in logs or rough pieces of wood.
- The presence of toys in the primary enclosures should also not be forgotten. Even though some cats won´t play with them, studies have shown that adopters show a preference for cats living in enclosures with toys, increasing their chances of being adopted.
- Not only dogs benefit from feeding enrichment! Cats do as well, and there are several cost-reduced options to do so. Examples include introducing dry food inside fenestrated toilet paper rolls, serving as a handmade disposable food dispenser, or inserting wet food inside empty yogurt pots.
- More ideas on how to provide cost-effective solutions for cat´s enrichment can be accessed through these links: http://www.aspcapro.org/resource/saving-lives-adoption-programs-behavior-enrichment/enrichment-shelter-cats; http://bestfriends.org/resources/cats/cat-enrichment; http://www.maddiesfund.org/enrichment-for-shelter-cats.htm.
- Out of cage time should be an option, especially for long-term stay animals. This can be accomplished by having a specific room, or even specific enclosures. Biosecurity measures should be in place in order to avoid infectious disease spread, therefor,

vaccination, cleaning and disinfection of the space for used for this purpose is extremely important.

- The public should be allowed to interact with cats housed on the adoption floor. This interaction, either in the form of petting, playing with the cat or just spending some time in its presence is very important to help potential adopters make their decision, and should therefore be made available.