FUNCTIONAL APPROACHES TO PET HOSPITAL DESIGN: A COMPARATIVE ANALYSIS ON EXAM ROOMS IN ANKARA

A THESIS SUBMITTED TO
THE GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES
OF
ÇANKAYA UNIVERSITY

BY

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IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR
THE DEGREE OF MASTER OF SCIENCE
IN
INTERIOR ARCHITECTURE

SEPTEMBER 2006

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Title of the Thesis: **Functional Approaches to Pet Hospital Design; A Comparative Analysis on Exam Rooms in Ankara**

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ABSTRACT

FUNCTIONAL APPROACHES TO PET HOSPITAL DESIGN:
A COMPARATIVE ANALYSIS ON EXAM ROOMS IN ANKARA

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September 2006, 133 pages

The purpose of this thesis is to discuss and outline the functional suggestions on the factors that need to be considered while designing pet hospitals. In addition, specific points that should be taken into consideration in designing pet hospitals have been explained in detail through an analysis of hospital zones and sections. In addition, use of companion animal facility projects has been studied taking environmental care and public health into consideration. Moreover, definition and objectives of the veterinary career has been explained and the history of the veterinary profession in Turkey and abroad has been defined. Practice and functions of veterinary in Turkey have been cited as well. From this point of view, a case study in relation to the exam rooms of pet hospitals in Turkey has been carried out and studied under the headlines of this thesis. Marginal suggestions on exam rooms which conform to veterinary facility requirements in Turkey have also been discussed.

Keywords: Companion animal, health, veterinary medicine, pet hospitals.

öz

EVCİL HAYVAN HASTANESİ TASARIMINA FONKSİYONEL YAKLAŞIMLAR;
ANKARA EVCİL HAYVAN HASTANELERİNDEKİ MUAYENE ODALARI ÜZERİNE BİR ÇALIŞMA

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Yüksek Lisans, İç Mimarlık Bölümü
Tez Yöneticisi: Doç. Dr. G. Ufuk Demirbaş

Eylül 2006, 133 sayfa

Bu tezin amacı, evcil hayvan hastanelerinin tasarlanmasında göz önüne alınması gereken etkenlere getirilen fonksiyonel önerileri tartışmak ve ana hatlarını ortaya koymaktır. Ayrıca evcil hayvan hastanelerinin tasarlanmasında dikkate alınması gereken başlıca konular bu hastanelerin bölüm ve kısımlarının incelemesi doğrultusunda ayrıntılı bir şekilde açıklanmıştır. Evcil hayvan tesis projelerinin yararları çevre bakım ve toplum sağlığı göz önününe alınarak incelenmiştir. Diğer taraftan veterinerlik kariyerinin tanımı ve amacı açıklanmış, yurtiçi ve yurtdışındaki tarihçesi aktarılmıştır. Ayrıca bu çalışmada, Türkiye'deki veteriner hekimliği bölümlerine ve bu bölümlerin işlevlerine değinilmiştir. Bu tezin ortaya koyduğu bilgiler doğrultusunda Ankara'daki evcil hayvan hastanelerinin muayene odaları ile ilgili bir çalışma yürütülmüştür. Bu tesislerin gereksinimlerini karşılayan muayene odalarına yönelik işlevsel öneriler çalışmaya uygun şekilde tartışılmıştır.

Anahtar Kelimeler: Evcil hayvan, sağlık, veterinerlik hekimliği, evcil hayvan hastaneleri.

ACKNOWLEDGMENTS

I wish to express my deepest gratitude to my supervisor Asst. Prof. Dr. G. Ufuk Demirbaş for her guidance, advice, criticism, encouragements and insight throughout the research.

I would also like to thank Prof. Dr. Cüneyt Elker and Prof. Dr. Mustafa Kaymaz for their suggestions and comments.

The technical assistance of the personnel in Ankara Veterinary Medical Center, Beysukent Veterinary Clinic, Ankyra Animal Hospital, Çayyolu Veterinary Clinic, and Mr. Tolga Uçartürk are gratefully acknowledged.

I am very grateful for the support, help and effort of my family and my wife Emel Vatansever Baştürk. I wish to express my heartily thanks to all above.

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INTRODUCTION

Health care design for pets is an exiting and exacting specialty within commercial interior architecture. According to Piotrowsky and Rogers (1999), several designers who have specialized in health care design for pets point out that it is not the same as doing an office, a hotel, or other types of commercial interior design to produce a successful project. In addition, Piotrowsky and Rogers indicate that the design of veterinary facilities is not thought of by most as a part of health care although it is technically part of the overall health care industry. Moreover it is also a specialty in architecture that most of the designers neglect (Piotrowsky and Rogers, 1999).

From the view point of Piotrowsky and Rogers (1999), pet-health care is concerned with the science and art of dealing with the maintenance of health and the prevention, alleviation, or cure of disease. "Although there are many similarities among the various specialties, each has its own needs, which will require individual design solutions" (Piotrowsky and Rogers, 1999, 181). To be effective in the area of designing health care facilities for pets, Piotrowsky and Rogers (1999) recommend designers to have a solid understanding of the overall health care field associated with the medicine, and the laws and regulations that apply to the design of health care facilities.

Piotrowsky and Rogers (1999) mention the overall goal of the pet-heath care is to provide patients with the most effective and successful treatment. Treatment may consist of preventive medicine, treatment for disease and/or illness, or health maintenance. It may occur for a short term or long term, and to improve the patient's quality of life. Furthermore the goal of health care design for pets is described by Piotrowsky and Rogers as to understand each specialized area, the design needs of specific assignment, and to develop appropriate design solutions and specifications. "Since the health care industry is one of the fastest-growing components of the economy, it is a worthwhile focus for all designers" (Piotrowsky and Rogers, 1999, 182).

When veterinary is considered in Turkey, it is seen that veterinary profession becomes a very common business area. While England has 5, Australia and Netherlands have 1 veterinary faculty each, and Turkey has over 20. This is the reason why quality is reduced in Turkish veterinary (Berberoğlu, 2004; Gülbay, 2004). Now in Turkey, there are about 4500 veterinary practitioner working in companion animal (pet) field and there are 220 registered veterinary facilities in Istanbul and over 120 in Ankara (Cited in Yeşildere, 2004). Companion animal facilities in Turkey mostly occupy basements of buildings and some of them are in very small apartments that are not acceptable for their functions. Animal health care is also currently the main point that European Union advices Turkey to take into consideration to make innovations to treat and preserve animals in better conditions (Berberoğlu, 2004).

The aim of this thesis is to provide designers with the basic points to create healthier, functional, working spaces in pet hospitals that are rarely observed in Turkey. Moreover, this study provides readers and veterinarians with multiple ways to achieve convenient environments for doctors of veterinary medicine, personnel and pet owners as well as pets considering their needs in a companion animal facility. From this point of view, the thesis focuses on the subject field which also identifies and discusses the specialties and subspecialties, describes the basic facility from an interior design standpoint. Furthermore the thesis

presents functional solutions to problems while designing a pet hospital. Key issues of designing a veterinary facility are presented in this study.

This chapter defines the history of the veterinary medicine in the West and Turkey to point out the role of animals in people's life and then the chapter states the meaning and value of the veterinary medicine for the wellbeing of humans as well as presenting basic definitions of the subject field to assist the next chapters. The second chapter presents the key issues of veterinary facilities in Turkey. In addition, it focuses on pet hospitals and its sections. An animal's health care procedure in a pet hospital also takes place in this section. The next chapter continues through the definition of factors that affect a pet hospital design. Basically technical factors are analyzed in order to take precautions according to fundamental conditions that occur in a pet hospital before analyzing minor considerations. The fourth chapter consists of the considerations that should be taken when designing a pet hospital. Regarding zones and sections, critical considerations that have an influence on pet hospital design are pointed out. The case study is introduced in the final chapter. Regarding the information that the thesis presents, exam rooms of the sample pet hospitals are analyzed in the study. The purpose of this study is to define ideal exam rooms for veterinarians who plan to set up a companion animal facility in Turkey.

1.1 The History

Before expanding on companion animal facilities, the role of animals in people's life throughout history needs to be pointed out for a better understanding of the importance of taking care of their health.

Throughout history, Chinese people are known as the first to take care of animals medically. Although it is known that the first medical text was "Nei Ching Su Wen" (Yellow Emperor's Classic of Internal Medicine), 300 B.C., according to early Chinese writings**,** traditional Chinese medicine was practiced before 1766 B.C. The Nei Ching detailed the acupuncture system to include other medical knowledge as

well. On the other hand, in ancient Greece**,** such writings have also been preserved which indicates interest in animal diseases. During the period of Romans, Cato 200 B.C. Roman agricultural writer recommended the use of olive oil residue, lupine extract and wine for sheep scab. Moreover, in the time of Christ, the treatment of horses has been mentioned in various written records including fairly detailed diagrams of horse anatomy and acupuncture in China. Such records emphasize that horse anatomy/acupuncture is more significant than human acupuncture maps, because horses were more valuable than people. Furthermore, during the period of Renaissance, inventors and scientists such as Leonardo da Vinci and Ruini, influenced the advancement of equine (horse) dentistry (Ross, 2003). In the history, Turks are also known as a nation that gave great importance to their horses as they were nomad and voyager. They were used to care their horses most of their lives.

The development of the modern veterinary begins in 18th century in Europe. The history of modern veterinary in the West and Turkey takes place in the following sections.

1.1.1 The History of Veterinary Medicine in the West

In Europe, at the first half of 18th century, military, economic, social life were so affected from death of 200 cows because of plague disease and death of military animals due to such diseases. Nations described disasters caused by diseases carried by animals as the most important disasters after the natural disasters. The need of educating veterinary practitioners has occurred due to these unstoppable diseases. Therefore the first veterinary school started education on the 2nd of February in 1762 in France (Cited on the website of IVHO, 2004). Very early veterinarians mainly concerned the care of livestock, horses and mules. Veterinarians, plant biologists and certainly physicians had been first in Europe in the 1800's and later dominated by Americans in the 1900's, played a major role in the development of modern disease control and treatment. They have been

instrumental in the development of organ transplantation, transgenic and almost every other important medical development (Ross, 2003).

1.1.2 The History of Veterinary Medicine in Turkey

Veterinary education in Turkey was initiated by the guidance of a Prussian military veterinarian Mr. Godlewsky to meet veterinary medication requirements of the Turkish military units. For this purpose, first Military Veterinary School was opened in Istanbul in the year of 1842. In addition, in 1889, a nonmilitary veterinary school was started to bring up and educate civilian students in Istanbul. During the same period, Veterinary Affairs Directorate "Veteriner İşleri Müdürlüğü" was established to fulfill laboratory, training, teaching, researching and practicing prerequisites of veterinary medication services. Moreover, military and nonmilitary schools were integrated in 1920 to become Veterinary Surgery School "Baytar Mekteb-i Alisi". In 1928, the title of the school was changed to be Veterinary Surgery College "Yüksek Baytar Mektebi". Thereafter, since 1960 several veterinary faculties have been established in Elazığ, İstanbul, Bursa, Konya, Van, Kars, Aydın, Burdur, Diyarbakır, Urfa, Hatay, Kırıkkale, Afyon and Kayseri (Cited on the website of TVHB, 2004a; cited on the website of IVHO, 2004).

1.2 The Definition of Veterinary and Its Purpose

"Personally, I have always felt the best doctor in the world is the Veterinarian, he can't ask his patients what's the matter, he's just got to know" says Will Rogers (1935) who is a famous philanthropist philosopher. Veterinary is one of the important fields in medicine as Rogers mentions the significance of veterinary practitioners. In order to point out the meaning of veterinary in human's life, the definition and purpose of veterinary, and the description of a veterinary medical doctor (VMD) needs to be identified.

Veterinarians play a major role in the health care of pets, livestock, zoo, sporting, and laboratory animals. Veterinarians also use their skills to protect humans against diseases carried by animals, and conduct clinical research on human and animal health problems (Cited on the website of UNE, 2006). Most veterinarians perform clinical work in private practices. About one-half of these veterinarians dominantly or exclusively treat small animals. Small animal practitioners usually care for companion animals, such as dogs and cats, but they also treat birds, reptiles, rabbits, and other animals that may be kept as pets. Some veterinarians work in mixed animal practices, where they see pigs, goats, sheep, and some non-domestic animals in addition to companion animals (Cited on the website of DU, 2001).

Veterinarians in clinical practice diagnose animal health problems, vaccinate against diseases such as distemper and rabies, medicate animals with infections or illnesses, treat and dress wounds, set fractures, perform surgery, and advise owners about feeding, behavior, and breeding. They also perform surgery including cesarean sections on laboring animals and do artificial insemination. Moreover veterinarians euthanize animals when necessary as well (Cited on the website of UAMS, 2000). Veterinarians who treat animals use surgical instruments; medical equipment, such as stethoscopes; and diagnostic equipment, such as radiology machines. Veterinarians contribute to human as well as animal health. A number of veterinarians work with physicians and scientists as they research better ways to prevent and treat human health problems such as cancer, AIDS, and alcohol or drug abuse (Cited on the website of DU, 2001). Veterinarians who treat animals are discussed under the title Practitioners of Veterinary Medicine as follows:

Practitioners of Veterinary Medicine: Veterinary practitioners are medical professionals whose primary responsibility is protecting the health and welfare of animals and people. Veterinarians diagnose and control animal diseases, treat sick and injured animals, prevent the transmission of animal diseases ("zoonoses") to people, and advise owners on proper care of pets and livestock. They ensure a

safe food supply by maintaining the health of food animals. Veterinarians are also involved in wildlife preservation and conservation and public health of the human population (Cited on the website of DSC, 2006; cited on the website of ISVMA, 2003).

Today's veterinarians are members of an important health profession. In taking the veterinarian's oath, a doctor solemnly swears to use his or her scientific knowledge and skills "for the benefit of society, through the protection of animal health, the relief of animal suffering, the conservation of animal resources, the promotion of public health, and the advancement of medical knowledge" (Cited on the website of AVMA, 2006). As it is understood from the veterinarian's oath, veterinary practitioners provide a wide variety of services in private clinical practice, teaching, research, government service, public health, military service, private industry, and other areas.

At this point, it would be appropriate to discuss veterinary facilities in Turkey in order to clarify the field veterinarians work in Turkey.

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CHAPTER 2

VETERINARY FACILITIES IN TURKEY

Most of the veterinary facilities take place as companion animal facilities in Turkey. These facilities predominantly take care of small animals and most of them perform their works in apartments that they rent or buy. These facilities need to practice regarding standards of veterinary facilities in Turkey. These standards are regulated through the law. The construction, operations, license formalities, and inspections of the veterinary facilities in Turkey have been regulated by law number 6343 dated 9 March 1954 (Cited on the website of TVHB, 2004b). In addition, functions of veterinary facilities in Turkey are regulated in the Official Gazette. According to the official gazette, veterinary facilities have been established to diagnose, cure, heal and isolate sick animals and protect them from bacteriological, viral and parasitic and epidemic diseases which might also infect local people in contact (Cited in TKB, 1999). Related regulations are given in attached appendices regarding the Unions and Chamber of Veterinarians as well as their functions, operation and services.

2.1 Types of Veterinary Facilities

There are mainly three types of veterinary facilities in Turkey. These are namely, veterinary hospital, medical examination office, and lastly animal policlinic. Pet hospitals take place in animal hospitals.

Animal Hospital: The first type is a facility where outpatient and inpatient medical diagnosis and treatment are given for all animals. It is called Animal Hospital "Hayvan Hastanesi." The second type is a facility where medical diagnosis and treatment are given for inpatient and outpatient pets. It is called Pet Hospital "Süs Hayvanları Hastanesi" (Cited in TKB, 1999).

Animal Medical Examination Office "Muayenehane": It is a veterinary job site where outpatient animals are examined; diagnosed and medical treatment is given (Cited in TKB, 2001).

Animal Policlinic "Poliklinik": It is the combination of medical examination offices where multiple veterinary surgeons execute their job (Cited in TKB, 2001).

2.2 Pet Hospital

Pet hospitals offer veterinary services for small animal patients which are also called "companion animals". Their services include examination, dentistry, radiology, surgery, and overnight hospitalization. Besides these services, pet hospitals in Turkey can include such sections that take place below. This section of the study includes an animal's health care procedure in a pet hospital.

2.2.1 Sections of Pet Hospitals

Pet hospitals in Turkey generally consist of the sections indicated below:

- Chief Supervisor Office
- Veterinarian Office
- Staff Room
- Showers and WC
- Waiting Room
- Emergency Room
- Examination and Diagnosis Room

- Pre-Surgery Room
- Operation Hall
- Sterilization and Cleansing Room
- Intensive Care
- Radiology and Ultrasonography
- Laboratory
- In-Bed Patients Room (Confinement)
- Isolation Room
- Pharmacy
- Insemination and Embryo Transfer
- Hair Cut and Clearance Room

These functions and sections of companion animal hospitals are presented in Table 1 regarding the regulations in Official Gazette (Cited in TKB, 1999).

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Table 1. Sections of Pet Hospital

(TKB, Apr. 1999. Regulation on Establishment, Opening, Operating and Inspection Bases and Procedure of Animal Hospitals, *Official Gazette*, no: 23671, Ankara)

Sections of Pet Hospital	
Sections	**Definitions**
Chief Supervisor Office	Pet hospital has an office for veterinary medical doctor (VMD) who is responsible together with the founder of the facility for all functions, transactions and arrangements to run the hospital.
Veterinarian Office	In companion animal hospital, there should be an office for VMD who is responsible for taking precautions against epidemic diseases, and diagnosis and medical treatment besides producing higher quality animal products, working on latest breeding technologies and fighting against zoonosis to prevent public health.
Staff Room	This section consists of a room for animal care personnel, a secretary and a personnel responsible for washing and hair cutting.
Showers and WC	This section is arranged for hospital personnel.
Waiting Room	This section is arranged for animal owners. It must be large enough to provide comfort for all waiters.
Emergency Room	This section is only for those animals in emergency case and need emergency medication. Required tools medicines and other material must be handy in this section.
Examination and Diagnosis Room	Animals are examined; medical treatment, vaccination, i.v. solutions and other biological fluids are given in this section.
Pre-Surgery Room	In this section, animals are prepared (hair cut, shave etc.) for surgical medication. Pre-Surgery room has an entrance to master operation room.
Operation Hall	Animals are partly or entirely anesthetized and operated in this room.

Table 1. (cont.)

Sections of Pet Hospital	
Sections	**Definitions**
Sterilization And Cleansing Room	All necessary equipment and units for sterilization are kept in this section. However cleansing room must be linked with sterilization section.
Intensive Care	This room is used temporarily for post operative medication.
Radiology and Ultrasonography	This room must be large enough to include all radiological equipment and ultrasound units and give access for working personnel.
Laboratory	This section includes all tools and equipment for bio-chemical process and examination of blood, urine, excretion, skin erasures and other extracts; and for identification and isolation of microorganism. However, each unit operates apart from other units.
In-Bed Patients Room (Confinement)	This room is for nourishing, resting, sleeping and to give care for any kind of in-bed animals. Room must include necessary tools to prevent animals from injuring themselves and damaging around. Cages for pets and winged animals are made available in this section as well.
Isolation Room	This section is enclosed securely and has no correlation with other rooms and used only for animals having infections or epidemic disease cases.
Pharmacy	This section is so arranged for medicines made available.
Fertilization and Embryology	This section with all suitable and necessary tools is used for only artificial insemination and embryo transfer (this process is to be carried out by a specialist veterinarian).
Hair Cut and Clearance Room	This room includes all necessary material for cleaning and shaving services. Such services must not have direct access with other medical surgical sections.

2.2.2 An Animal's Health Care Procedure in Pet Hospitals

An animal's health care procedure includes six stages in a pet hospital. These stages consist of admission, physical exam, routine lab checks, x-rays (radiographs), evaluation, and finally action.

Admission: The pet is admitted to the hospital in the morning and the veterinarian who is in charge of the case takes a thorough history (called anamnesis) and pays close attention to any major health impacting events in the pet's life. Current activity levels, nutritional factors and medications being administered are some of the topics discussed with the pet's caretaker. Vaccination status and recent health factors are also assessed (Dunn, 2004).

Physical Exam: The veterinarian performs a thorough physical exam in the presence of the pet's caretaker, encouraging the pet's caretaker to make any comments that may prompt the veterinarian's information gathering so that any subtle or forgotten aspects of the pet's body condition can be evaluated. The weight is recorded (and should be recorded every time the pet is brought to the hospital) and any deviations from normal are noted on the health chart (Dunn, 2004; Morrisette, 2003).

Routine Lab Checks: Blood is drawn for a basic Chemistry Panel and a CBC (Complete Blood Count) and a urine sample is collected. Usually the owner can obtain the urine at home in a clean container before the appointment. Common laboratory tests are required to be included in a Chemistry Panel (Dunn, 2004; Morrisette, 2003).

X-rays (Radiographs): If there is any indication of arthritis, abnormal aspects of the physical exam or other suspicious elements in the history or physical exam, radiographs are taken to gather more data on the patient (Morrisette, 2003).

Evaluation: When all laboratory test results are available, x-ray films have been read and the data gathering process is complete, the veterinarian will make an evaluation. If there are any substantial deviations from normal for a pet of this age, the veterinarian may suggest further tests be done. For example, if the patient is evaluated as being healthy but the history indicates a lack of energy or enthusiasm and the physical exam displays an overweight pet with some deficiencies in the coat condition (Dunn, 2004).

Action: The veterinarian discusses the results with the pet caretaker and suggests actions that should be taken. If a biopsy or further blood or urine tests are indicated, permission is obtained from the owner to proceed with additional tests and the next steps are taken. If the pet is healthy, another routine check is scheduled for the following year and the owner is encouraged to contact the veterinarian if anything suspicious develops in the interim (Dunn, 2004).

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CHAPTER 3

FACTORS AFFECTING PET HOSPITAL DESIGN

There are mainly four factors declared by authorities (See Hamilton, 1993a&b; Chapel, 2000; Hafen, G. 2004; Usiak, 2004) to be considered when designing a pet hospital. These factors are stated as location, exterior, interior and finishing materials. Pet hospital design is framed by several issues. Some of these aspects are stated by Hamilton (1993a&b) and Chapel (2000). While Chapel predominantly points out factors of location and exterior, Hamilton points out interior factors indicating the importance of noise and odor controls. Finishing materials are considered as an important factor in designing a pet hospital by G. Hafen (2004) and Usiak (2004).

Adelaide veterinarian John Hamilton emphasizes several issues in design work. According to Hamilton (1993a), a veterinary practice should ideally have the following attributes; firstly, it must look good. Secondly, it shouldn't smell. Thirdly, there should be no intrusive noise and finally, it should provide a good, healthy environment for the personnel, patients and clients (Godfrey, 1993).

3.1 Location

The facility location is one of the factors that help to determine the clients who are desired to attract and keep. A mega-study prepared and released in 1999,

shows that location was very or somewhat important to 54 percent of pet owners when they selected their current veterinarian. A good location may be explained as a locale that meets the quality of life needs, a high concentration of ideal clients, good visibility, and easy client access. The Veterinary Practice Evaluation Survey released in 1997 shows that the mean distance which clients travel to visit veterinarians is 8.53 kilometers and that 27 percent of clients travel less than 3,22 kilometers to visit their veterinary practices. The same study sponsored by Pfizer Animal Health in 1997, released similar findings when it surveyed 37,000 pet owners and 535 small animal practices nationwide. The survey asked clients what factors most influenced their decision to choose their present veterinary clinic. Forty-eight percent of respondents cited location as a factor. The survey showed that older clients were more concerned with location, while pet owners who live more than 3,22 kilometers from the practice more often said they were influenced by their friends and relatives (Harper, 2002).

According to E. John Knapp (2000), a maximum of 3,2 kilometers is the general rule if current client base is wanted to maintain (Chadwick, 2000a). In addition, when selecting a veterinary hospital's site, a high-traffic road may not be the best option. While conventional understanding suggests busy streets that provide the best visibility, clients who can not easily reach pet health care facilities will probably go elsewhere. Gates (1998) points out that clients prefer right turns into and out of parking lots, so access points need to be considered when choosing a site (Cited in Brown, 1998a)

Finally, Dr. Ross Clark (2002) advises that locating a new facility should not be more than 8 kilometers from the present location to avoid eroding client base (Cited in Schutte, 2002). It is also important to consider the relationship of the facility with its close environment. It should not be too close to residential areas such as houses and schools.

3.2 Exterior

The public is becoming more discerning about the environment that their veterinarian practices in and their animals are kept (Godfrey, 1993). Clients and potential clients start evaluating veterinary facilities from the exterior which is another factor that can detract from clients' impressions of facility. Dan Chapel says "Your facility exterior should echo the professional image you're working to portray" (Chapel, 2000).

When sitting a companion animal facility, consideration should be given to the activities in the adjacent buildings and any activities that may have an effect on the welfare of the animals. A companion animal facility forming part of a larger complex should be designed to be self-contained. Wild, stray or pet animals should not be able to gain entry to any part of the facility, including stores and personnel areas. Special care is needed where drains and other services pierce the walls or floors to ensure that they have been adequately proofed against vermin (Cited on the website of Science Research & Statistics, 2004).

Regarding the exterior of a pet hospital, the following are the next design areas that are required to be taken into consideration.

Landscaping: Exterior of the facility needs to be considered with the message it sends. Landscape must mention business to look prosperous. Planting shrubs provides blocking unwanted sights and sounds from facilities and neighbors or nearby streets. Furthermore welcoming effect is available by flowering plants and other greenery. The right landscaping makes a huge difference in clients' perceptions of a companion animal facility (Chapel, 2000). If outdoor space is available, outdoor park and play areas might be designed to function as settings for fun community events e.g. inviting local agility clubs to have events at the location or other related activities (Schlaffer and Bonacci, 2001).

Signage: Designing an attractive, easy-to-read signage that includes practice name and street address provides prospective clients to locate the facility easily. Sign of a companion animal facility that is established with the practice's identity with color and logo reflects professionalism of the business. Also the sign's size and placement needs to be designed so that clients can spot it at a distance (Chapel, 2000).

Parking: Parking spaces must be large enough to accommodate both clients and employees. A separate parking area can also be designated for the personnel or one spot can be labeled for drop-offs only. Lastly parking area must be created with a connection to pet relief area (Chapel, 2000).

Pet Relief Area: This area functions to relieve pet anxiety and keep pet hospital clean. Dan Chapel (2000) suggest landscaping an area especially for dogs to relieve themselves while walking from the parking lot to front door. Pet relief area might be located just off the sidewalk; the 4,88 by 6,10 meters area's circle walk gives dogs plenty of possibilities. Dr. Belknap who is the winner of Veterinary Economics' 1996 Hospital of the Year says "Dogs need a place to relieve themselves or mark their territory." Dr. Belknap (1998) says "Then dogs don't use the reception area, they establish their territory and are more comfortable in the hospital" (Cited in Brown, 1998b).

Entrance: Clients must get inside easily in case of struggling with an agitated pet and a bulky container. In this situation, the ordinarily simple act of opening door becomes an ordeal. Widening spaces in front of the entrance must be considered. Therefore clients are able to open door with one hand**.** Moreover this will minimize confrontations between agitated animals at walkways and doors. Older pet owners and clients with disabilities are another important concern which should not be ignored (Chapel, 2000).

Designing Separate Entrances or a Single Entrance: There are various opinions mentioned by authorities about this manner. Each option has its own utility and

disadvantages. Experts recommend sticking with one entrance, even if two waiting areas are designated. Knapp (2002) says "Separate entrances disrupt traffic flow and make the reception area look small" (Taylor, 2002). Dr. Dennis Cloud (2002) shares the same opinion with Knapp and says "A few of my colleagues use separate dog and cat entrances and really like them." He states: "But this trend in entrances seems to be fading" (Cited in Taylor, 2002).

Separate entrance approach is also supported by some experts (See Mellott, 2000; Chadwick, 2000b). According to these experts, separate entrance should not distance the groomer from boarding or hospitalized pets that require grooming before going home. Many boarding and grooming clients prefer to separate their pets from sick animals visiting the practice. Mellott (2000) points out advantages and disadvantages of the separate entrance approach. He states that separate entrances often mean an additional reception area and staff member, on the other hand keeping retail clients flowing through the hospital entrance boosts sales possibilities (Cited in Chadwick, 2000b). On the other hand, with regard to sales possibilities, R. Hafen (2000b) points out that adding a separate retail entrance does not capture potential sales in other areas. R. Hafen (2000b) says "A single entrance reinforces the one-stop-shopping mentality." He states "Every time clients visit, you can provide medical services and boost retail sales" (Cited in Chadwick, 2000b).

R. Hafen (2000b) spotlights some alternatives solutions for designing entrances as;

1. Using one entrance to an oversized reception area.
2. Designing two entrances nearby with separate lobbies but one common reception area to share records.
3. Situating two entrances with separate reception areas for boarding and grooming and veterinary services.

R. Hafen also suggests considering practice size, traffic flow, and staffing abilities before choosing separate entrances (Cited in Chadwick, 2000b). With regard to

entry of a companion animal facility, there would be considerations to make the facility accessible in the following chapter.

3.3 Interior

Structure of the veterinary facilities is the source of major problems. Although pre-existing facilities seem economical, they have also disadvantages especially in usage of interior spaces. Tradition and economic reality mean veterinarians set up their practice in a small pre-existing facility, perhaps their home. The issue of the structure is, however, becoming a bigger factor in how the profession works (Godfrey, 1993).

Interior factors are vital for pet hospital designs as well as for pre-existing facilities. Most of the problems which stem from designing occur in interior areas of these hospitals. Noise, odor, lighting, ventilation, circulation and finishing material are such problems of interior. However finishing materials are analyzed in detailed in another section. "No one wants to hear a constant background of barking dogs during consultations or telephone conversations" Hamilton says to mention noise problem. According to Hamilton (1993b), odor is another aspect that must be aware of in pet hospitals. Inadequate odor control makes a regular event very off putting to clients. Moreover bad odors from poor ventilation and possible poor standards of hygiene are often perceived by clients to be indicative of poor standards of professionalism. Hamilton also draws attention to avoiding narrow circulation spaces. Hamilton says "Staff, clients and animals needs to move around freely." Selecting poor quality materials is another drawback to pay attention to. This is false economy especially in frequent or hard use areas (Cited in Garcia, 1993).

3.3.1 Noise and Odor

The noise and odor control of a facility is an important factor in any type of facility, but there certain cases where this issue becomes a main issue that may

affect the clients' decision as a primary influence. If a companion animal facility has a bad odor, clients may worry that medical care of the facility is inefficient. That is why it is critical to minimize noise and odor. Besides making a better impression on clients, controlling odor and noise makes pet hospital a nicer place to work (Hafen, R. 2000a).

3.3.1.1 Noise Control

The control of noise is an important factor in the care of pets. Loud, unexpected and unfamiliar sounds including ultrasound can cause stress for the animals, and seriously cause behavioral disturbances. On the other hand, there is no indication that constant background noise, such as that generated by air-conditioning and similar equipment, is harmful to animals. It must be controlled so that it is not too loud. During the design of accommodation, it is important to pay attention to the use of materials and the sitting of equipment which will minimize noise and vibration levels in the rooms. Equipment such as fire alarms, door bells and telephones should be of the so-called 'silent' type, which are inaudible to small rodents (Cited on the website of Science Research & Statistics, 2004).

Animals may detect different sound frequencies than do human beings. Therefore, noise in animal rooms should be minimized whenever possible. Normally, playing music is not advisable in animal rooms although it may be necessary under some circumstances to provide enrichment or "white noise" (to mask a different noise). Noise from mechanical equipment in adjacent areas should be avoided (Cited on the website of RAR, 2003).

According to Namek (2000), noise control is a significant concern. Namek (2000) mentions that noise transmission depends on the building design and construction materials. However mechanical equipment is a source for noise emission. Designers have an obligation to design within acceptable noise levels (Namek, 2000).

Although noise can not be totally eliminated, it can be contained and prevented from spreading through the facility with some strategies which are stated below.

Absorbing the Sound: Noise can be kept from bouncing off walls and traveling around by installing noise-absorbing materials. For pet hospitals, designers are required to choose products with a high "Noise reduction coefficient" (NRC) rating. The NRC figures are based on lab tests that determine how much sound the material absorbs. For example, a ceiling tile with an NRC of .65 absorbs 65 percent of the reverberant noise that hits the tile; an NRC of 1.0 means the tile absorbs all reverberant noise. Especially sound-absorbing materials must be applied in animal rooms to minimize noise in the facility. R. Hafen (2000a) recommends using perforated mylar-faced acoustic ceiling tile with an NRC of .65; hanging mylar-faced sound baffles with an NRC of 1.0 from the ceiling; and placing sound-absorbing, fabric-wrapped wall panels with an NRC of .85 to 1.0 on the wall (Hafen, R. 2000a). Although these materials absorb sound well, they're not durable or easy to clean. Therefore these materials need to be installed where
they are protected from getting wet or damaged.

Building Better Walls: Initial bark, squeal, or yell of animals are still contained however absorption keeps sound from bouncing off the walls. Designers use "Sound transmission coefficient" (STC) ratings to describe how much noise a material screens out. For example, a wall with an STC of 45 stops about 45 decibels of sound. A dog bark generates 100 or more decibels. It is not necessary to build a wall that screens out all of that noise. A wall with an STC of 55 to 65 works fine for an animal room because normal background noise masks the 35 decibels of sound that escapes. It must be guaranteed that sound-isolation walls are extended to the roof deck to stop noise from traveling up and over. Table 2 shows wall rates according to sound transmission coefficient.

Table 2. Wall Rates According To Sound Transmission Coefficient

(Hafen, R. Aug. 2000a. Minimize Noise and Odor, *Veterinary Economics*)

WALL TYPE	**Sound Transmission Coefficient (STC)**
5,08 centimeters by 10,16 centimeters plasterboard wall with plasterboard on both sides	STC of 35
5,08 centimeters by 15,24 centimeters plasterboard wall with staggered studs and two layers of plasterboard on each side	STC of 58
20,32 centimeters thick concrete block wall with the voids filled	STC of 55.

Windows must also be considered to add wall's sound blocking power. A 0,32 centimeters thick piece of glass has an STC of just 25. It should not be ignored that a 5,08 centimeters square opening completely works against the sound isolation capabilities of the wall. Moreover a window in a sound-blocking wall needs to be made of two layers of glass separated by a 5,08 centimeters air space to get an STC of about 45. The type of door makes a difference as well. A typical hollow-core wood door offers an STC of 35, while a typical solid-core wood or hollow metal door boasts an STC of 45 (Hafen, R. 2000a).

Finally, to take advantage of the background noise, R. Hafen (2000a) recommends designing animal rooms near busy medical areas and not next to the doctors' office or a consultation room.

Raising the Roof: Increasing the height of ceilings in animal rooms to 300 centimeters or higher helps minimize sound bouncing off the ceiling and gives more room to install absorbent wall and ceiling panels and baffles.

Covering Up: Studies show that easy-listening and instrumental music calm animals in holding areas actually. Consequently, clients and their pets can be soothed accordingly.

Block off Hidden Passages: Air ducts may be noise conductors. Fortunately, heating and ventilation zones often match with sound-control zones, Therefore ducts which pass from noisy areas to quiet ones can usually be eliminated. Otherwise, a sound attenuator in the duct or sealing the joint between the wall and the attenuator need to be considered to protect entire areas from noise (Hafen, R. 2000a).

3.3.1.2 Odor Control

While uncontrolled noise disturbs individuals in a facility, unpleasant odors also cause such disturbance like chemosis water or nausea which may be even worse. Through the capabilities of architectures and building systems, designers maintain tight environmental control over the facility to avoid the introduction of contaminants or pathogens, and prevent the possibility of infectious outbreaks. Thus designers eliminate the transmission of odors in companion animal facilities (Stark, 2003). Strategies to prevent companion animal facility from spreading odors take place below:

Eliminating The Source: Designing water hose bibs in convenient locations, and providing high-pressure, hot-water spray and disinfectant systems to wash away waste and bacteria that cause odors is the most obvious step for designers. A well-designed, adequately sized floor-drain system also facilitates waste removal.

Keeping Clean Air Flowing: Odors travel through the air, therefore adjusting air supply and exhaust controls most odors. In most companion animal facilities, air supply and exhaust systems functions inadequately due to smaller utility bills. This approach compounds odor problems by sucking smelly air back into the system and pumping it into other rooms (Hafen, R. 2000a). Frequency of air change varies according to authorities. Schlaffer (2001) recommend that the minimum is 10-12 air changes per hour and 12-15 air changes are enhanced for odor control (Schlaffer and Bonacci, 2001). Detailed information about adequate air changes is mentioned in ventilation section.

Developing a Multi-Zone System: In a multi-zone system, rooms with similar heating and cooling requirements or odor-producing potential are grouped, and according to that HVAC (Heating, Ventilation and Air Conditioning) units are separated. For example, wards, kennels, grooming, and bathing areas are possible to keep in one zone while a doctors' office, the reception area, and exam rooms in another (Hafen, R. 2000a). The zone system lets facility provide different amounts of fresh air depending on need and keeping odors from spreading between zones. Emphasis must be placed on the return air for one zone, since it must not draw from an adjacent zone.

Creating Areas of Positive and Negative Pressure: To create negative pressure in a room, more air has to be exhausted than supplied. To create positive pressure, more air has to be supplied than exhausted. Negatively pressured rooms hold odors inside, and positively pressured rooms discourage entry of air and odors. For example, if positive pressure is created in the reception area, odors are kept from migrating from the back of the clinic. If negative pressure is created in the ward and kennel, clean air will be drawn from the rest of the clinic. Positive pressure also helps controlling germs and contaminants. Pumping more air into surgery than returning air keeps germs from entering; exhausting more air than the air returned from the isolation ward helps minimize the spread of contaminants (Hafen, R. 2000a).

Variety of pressurizations according to the spaces of a pet hospital takes place in the ventilation section.

3.3.2 Lighting

With regard to preferences, animals are like human beings, they like a room with a view. It is important for people and animals to "know" day and night for their sense of well-being. Natural light is beneficial to sanitize surfaces with ultraviolet radiation. It is motivating to see and watch events outside and keeps the animals in hospital from being bored or lonely (Schlaffer and Bonacci, 2001).

Indoor housing facilities for pets must be lighted well enough to permit routine inspection and cleaning of the facility, and observation of especially for dogs and cats. A regular diurnal lighting cycle of either natural or artificial light should be provided for animal areas. In addition, lighting must be uniformly diffused throughout animal facilities and provide sufficient illumination to aid in maintaining good housekeeping practices, adequate cleaning, adequate inspection of animals, and of course, for the well-being of the animals. Primary enclosures must be placed so as to protect pets from excessive light (Cited in APHIS, 1991). On the other hand, light levels should be adequate for pets to perform normal behaviors and for the animal care giver to perform their duties. The range of diffuse lighting in 130-325 lux is accepted adequate. The light cycle should be appropriate for the biology of the animal. A diurnal 12 hour light cycle is accepted standard. Furthermore light cycles should be changed gradually, not abruptly (Cited on the website of RAR, 2003).

Light is an important factor for constructing a new companion animal facility or substantially transforming an existing one. Lighting can change the entire atmosphere of a room. Natural lighting is especially effective and should be considered in designs that take advantage of glass. According to Longo (2003, 1-4) many practice owners prefer to use day-lighting design techniques and "cathedral ceilings" to create a sense of spaciousness. Longo implies that vaulted ceilings in waiting rooms of pet hospitals make those clients feel at home. Glass and light need to be put to even more effective use in the inner workings of the pet hospital itself (Longo, 2003, 1-4).

Lighting sets the tone. The right kind of lighting sets the mood for a practice. Wayne Usiak (2001) says "Using different levels of light and light fixtures in reception areas and waiting rooms create drama." Using incandescent lamps in seating areas sets a homier mood. Moreover combining different kinds of lighting fixtures such as recessed, pendant, chandelier, and track lights creates interest in companion animal facility (Chadwick, 2001). Usiak (2003) recommends pendant-mounted fluorescent lights with full-spectrum bulbs set. Therefore the light bounces off the ceiling, making the room brighter. Dr. Lamar Crossland (2003)

also states that high-quality lighting makes a huge difference in companion animal facilities. He adds "The right lighting sets the mood for clients and staff members" (Cited in Moser, 2003).

Chapel (2001) agrees that lighting helps set the tone for pet owners. Chapel states "Using incandescent lights in reception areas make a nice transition from the kind of lights clients use at home to the brighter fluorescent lights used in treatment and surgery areas of a companion animal hospital". For exam rooms of companion animal hospitals, changing lighting can be as changing the color of the light which is used. Light bulbs come in color temperatures that range from a cool blue, to white, to a warmer yellow. Moreover John Knapp (2001) advises to use four-tube fixtures in exam rooms, since four-tube fixtures instead of two tubes provide more light for exams (Cited in Chadwick, 2001).

Lighting in reception area is important for the first impression of clients. A quiet, warmly lighted, pleasant reception area welcomes clients better. Recessed incandescent spotlights over the reception and check-out areas lend a warm, homey feeling and make it easy for clients to read statements and sign forms (Chapel, 2000).

3.3.3 Ventilation

According to Ramzi Y. Namek (2000), ventilation is an important issue to address from the standpoint of a designer. The sense of smell as a visitor who walks into a hospital has an impact on the first impression of the facility. Pet hospitals, by their nature, have higher levels of objectionable odors. Therefore ventilating the facility becomes necessary in order to maintain a pleasant and healthy environment for animals, hospital personnel, and visitors. A properly designed ventilation system introduces oxygen-rich filtered air, reduces airborne pathogens which may be harmful for animals, maintains temperature and humidity levels within the designed limits and, finally, provides pressure differential between spaces (Namek, 2000).

As mentioned in previous sections, frequency of air change varies according to authorities. According to R. Hafen (2000a), heating, ventilation, and air conditioning (HVAC) system should provide ideally 6 to 10 air changes per hour and more in some critical areas. Meanwhile the air in a room will be replaced completely every 6 to 10 minutes. It should not be ignored that installed exhaust fans needs to be adequate. R. Hafen recommends the following air changes:

1. Runs and Dog Wards: 12 air changes per hour, with a minimum exhaust fan capacity of 500 cubic feet (14,15 cubic meter) per minute (CFM) and enough fans to provide 50 CFM per dog (1,41 cubic meter)
2. Cat Wards: 8 air changes per hour, with a minimum fan capacity of 200 CFM (5,66 cubic meter) and enough fans to provide 8 CFM (0,22 cubic meter) per cat
3. Grooming: 8 air changes per hour, with a multi-speed exhaust fan that offers at least 300 CFM (8,49 cubic meter)
4. Treatment and Medical Areas: 10 air changes per hour, with a minimum exhaust fan capacity of 300 CFM (8,49 cubic meter)
5. Office/Reception Areas: 25 percent to 50 percent of return air should be fresh, outside air.
6. Isolation: 8 air changes per hour, with a minimum exhaust fan capacity of 200 CFM (5,66 cubic meter)
7. Laboratory: A range hood with a 150 CFM (4,24 cubic meter) fan over the sink eliminates odors effectively, especially for fecals.
8. Exam Rooms, Bathrooms, and Dark Room: Exhaust when needed with a standard 90 CFM (2,54 cubic meter) fan (Hafen, R. 2000a).

Designing mechanical systems for pet hospitals requires attention to the unique needs of employees and patients similarly. Normally, ventilation rates are dependent on the size of the room in which the animals are housed, the quantity of cages, the number and size of the animals, the frequency of cleaning (or bedding changes), and the solar load on the spaces (Namek, 2000). The air changes, which pull in air from outside to replace air which has been circulated in

the interior of building, have a definite bearing on energy cost. On the other hand, if fresh air is not brought in from the outside, such problems as odor, bacteria, and disease transmission may possibly occur. It is a fine line between exceeding economic limits and creating a problem inside the kennels. Conversely, according to Chapel (1996), filtering and re-circulating the air is more beneficial when considering the fine line between paying extreme amounts of money to the electric companies and having problems inside the kennel. Chapel suggests designers leaving the ventilation open on window unit unless it is an incredibly hot day, and using an interior circulating fan. However Usiak (1996) suggests establishing zones for ventilating companion animal facility. Therefore the air from the kennels does not mix with the air in the rest of the clinic. According to Usiak, partitions that surround the wards and runs must be extended all the way up to the roof. Meanwhile any door that leads to another room must have a self-closing device. In addition, Usiak (1996) recommends an exhaust fan and a purge fan as well. Usiak (1996) says "The exhaust fan maintains the air-pressure difference you'll need to control the zone, so that the air flows into the kennel," and concludes "The purge fan will effectively remove any localized odors after a mess has been cleaned up (Usiak, 1996).

A pet hospital needs to include a variety of spaces with an accompanying variety of pressurization needs. This approach divides the facility into four basic regions. However each individual area is treated as needed. Table 3 proposes a zoning scheme for these rooms (N= Negative pressure, NN= More negative pressure; P= Positive pressure, PP= More positive pressure).

Table 3. Zoning Scheme for Ventilation in Pet Hospital

(Namek, Jul. 2000. Comfort for Vets and Pets, *Engineered Systems*)

ZONE	ROOM FUNCTION	PRESSURIZATION
1	Laboratory	±
	Pharmacy	±
	Treatment Room	± & NN on timer switch
	Surgery	PP
	X-ray and Darkroom	±
	Isolation Ward	NN
	Staff Room	±
	Doctor's Office	±
2	Reception/Clerical	±
	Waiting Lounge	±
	Filing and Records	±
	Exam Rooms	± & N on timer switch
3	Storage Areas	N
	Janitor Closet	N
	Toilets	N
	Bathing	±
4	Dog Runs	NN

3.3.3.1 Temperature Control

Temperature and humidity vary within an environment due to transient and constant factors. Constant factors include solar loads, building materials, and lighting in some rooms. Transient factors vary between one room and another. Among the transient factors for dog runs are animal metabolism and heat release rate, floor wash and frequency of bedding changes. In surgery rooms, the heat generated by the equipment and lighting is a significant transient load. In treatment rooms, transient loads include animal heat release rate, plus makeup air to compensate for large exhaust air quantities at timed intervals. Designers should take these factors into account.

Temperature varies according to different rooms of a pet hospital. The reception, waiting lounge, exam room(s), and record keeping should be designed at comfort levels of 21.1°C to 23.3°C dry-bulb (db), 20% to 30% relative humidity (rh) in the winter, and 23.3°C to 25.6°C, 50% to 60% rh in the summer. The treatment area is one of the busiest in the facility. It has numerous working tables to carry out procedures and it is used as an "intensive care unit" for post-treatment/surgical cases. The treatment room is the central location. Therefore it is open to many other rooms. Treatment rooms should be kept within 23.3°C to 24.4°C db and 50% to 60% rh. Animals which are recovering from anesthesia or during surgery are hypothermic (subnormal body temperature) and require elevated temperature of the environment, typically 27.22°C to 28.89°C db. Newborn pups and kittens do not have fully developed body temperature regulation mechanisms. Consequently, they should also be housed in environments with higher temperatures, typically between 29.4°C to 32.2°C db for the first week of life. Laboratories, X-ray, pharmacy, and surgery scrub rooms should be maintained between 22.2°C to 24.4°C db and 50% to 60% rh (Namek, 2000).

Dog boarding rooms also known as "dog runs" must have temperature control. If not properly designed and controlled, changes in the temperature and humidity of the room may cause health problems to the animals. Table 4 indicates dry bulb temperatures required for some animals.

Table 4. Recommended Dry Bulb Temperatures for Some Animals

(Namek, Jul. 2000. Comfort for Vets and Pets, *Engineered Systems*)

ANIMAL	**DRY BULB° C**
Cat	17,7 to 28,8
Dog	17,7 to 28,8
Rabbit	16,1 to 22,2

The equipment, insulation and design of the building should ensure that these temperatures are maintained in both winter and summer. The aim of designers is necessary to maintain the animal room temperature within the range specified for the species. Variations outside this range need to be avoided. It should be noted that temperatures within the cages are often higher than room temperatures. Environmental controls which designers set up should prevent undue variations in temperature within or between rooms, thus unnecessary stress would be avoided in the rooms accordingly. Finally outside exercise areas for dogs, cats e.g. need to be designed to provide shade during summer months and access to shelter during inclement weather (Namek, 2000).

3.3.3.2 Humidity Control

Extreme variations in relative humidity can adversely affect the well-being of some species by affecting the rate of heat loss and it can influence activity and food intake. The relative humidity in animal rooms should normally be maintained at 55%+or-15%. Humidity control systems are required to be designed to avoid extended periods below 40% or above 70% for some species (Cited on the website of Science Research & Statistics, 2004).

3.3.3.3 Sick-Building Syndrome (SBS)

The World Health Organization estimates that 30 percent of buildings exhibit sick-building syndrome. When a pet hospital suffers from SBS, symptoms can be stated that personnel complain of headaches; eye, nose, or throat irritation; itchy skin; dizziness and nausea; difficulty concentrating; fatigue; or sensitivity to odors; symptoms that disappear once a person leaves the hospital. Although such symptoms may indicate another illness, studies show that indoor air pollution can exacerbate health problem (Hafen, R. and Hughes, 1997). SBS is an important problem for animal health care facilities. It reduces personnel's performance. Designers must be aware of the factors which cause sick building syndrome.

These factors which take place below are constructed considering that the reason of SBS is mainly inadequate ventilation which creates discomfort:

Inadequate Ventilation: Many heating, ventilation, and air-conditioning (HVAC) systems do not distribute air evenly throughout the building and they create high pollution levels and contaminated air pockets which may cause SBS.

Indoor Pollutants: Pollutants inherent in companion animal facilities include anesthetic gases, gases emitted during X-ray processing, copy-machine exhaust, disinfectants, and pesticides. When these pollutants are not eliminated by such designs, they mix with emissions from adhesives; carpeting, vinyl, or rubber flooring and molding; and manufactured wood products. Consequently, they may cause SBS.

Outside Pollutants: Car exhaust, plumbing ventilation, or building and toilet exhaust may re-enter facility through improperly located air intakes and windows. Combustible products, including carbon monoxide and nitrogen dioxide from gas-fired, roof-top HVAC units must be designed not to re-circulate.

Biological Contamination: Bacteria, mold spores, pollen, and viruses can easily spread in the inactive waters which often take place in HVAC systems. Other sources of biological contamination are soiled packs, drapes, and equipment, and mildew on damp ceilings, walls, or floors. HVAC systems need to be designed not to bear these contaminations as well.

R. Hafen and Hughes (1997) recommend designers situating an adequate ventilation and exhaust system which is the most cost-effective way to reduce pollution. Another consideration that Hughes points out is coordinating the locations of air intakes and outlets correctly to avoid drawing materials back into the pet hospital. To avoid SBS while planning pet hospitals, extra fans must also be considered to capture vented vapors in some areas such as laboratories or "dirty preparation" areas, darkroom, copy-machine rooms, wards, and runs.

Lastly, high efficiency particulate airflow (HEPA) filters are advised to control up to more than 99 percent of organisms and isolate contagious diseases (Hafen, R. and Hughes, 1997).

The list below which is designed by R. Hafen and Hughes (1997) shows some of the materials which contribute to indoor air pollution.

The List of Materials Which Contribute To Indoor Air Pollution:

- Plastic Doors
- Treated Wood Foundations
- Vinyl Windows
- Particle Board (Unless Sealed or Formaldehyde-Free)
- Oil-Based Paint
- Asphalt Roofing Near Windows
- Vinyl or Asbestos Cement Siding
- Laminated Wood Paneling
- Epoxy or Petrochemical-Based Sealer
- Urea Formaldehyde Foam or Asbestos Insulation
- Soft Vinyl Flooring
- Wall-To-Wall Carpet
- Carpet, Panel and Construction Adhesives
- Unsealed Interior-Grade Plywood Cabinetry
- Galvanized Steel Supply Pipe

3.3.4 Circulation

Circulation is another important aspect that should be considered in the design phase of facility. In pet hospitals, circulation must be organized to permit controlled flows of people, animals, material, supplies, and wastes. The critical issue is the ability of the operator to maintain environmental control over the corridor and to avoid contaminants or infection (Stark, 2003). Experts recommend designing such areas to reduce human traffic in pet hospitals.

Creating multipurpose rooms, a central workstation, a communication centers and a flexible reception area provide hospitals with a desired circulation. G. Hafen (2001) advises designers to make the most of the space even when planning a new, bigger companion animal facility (Cited in Chadwick and Brown, 2001).

3.3.4.1 Multi-Purpose Rooms

The design of some spaces bring along the necessity of incorporating multiple tasks within one space. Thus, creating an efficient pet hospital is about evaluating space and rethinking the purpose of each room. According to Downing (2000), design strategies involve flexibility. Furthermore mobility increases the use of space greatly. R. Hafen (2000b) agrees with not using permanent fixtures and equipment. According to R. Hafen, they reduce available floor space. Regarding this consideration, rooms are required to be turned into multi-use rooms, for example doctor's office could serve as a consultation room as well. If an exam room is desired to accommodate any patient, designers are required firstly to consider the table's flexibility (Nichols, 2000). Larger exam rooms serve several purposes besides examining animals. Meanwhile exam rooms can be designed to function as an overflow area for treatment. An ideal ergonomic design for a companion animal facility needs to allow flexibility. R. Hafen (2000b) points out the use of flexible furniture to contain such equipments. When locating equipments, if available, designers are required to convert them into multi-purpose, mobile or wall-hung type, such as a wall-hung anesthetic machine on a swing arm, a rolling dental cart that can be part of the permanent countertop when necessary, tandem tub tables featuring a swing-arm dental unit in between (Cited in Nichols, 2000). Usiak (2000) recommends combining multiple functions in one room for several tasks as well (Cited in Chadwick and Gurnon, 2000).

Another aspect is creating a "comfort room" which works as a multiple function room to conserve space while reducing circulation. Staff members use the comfort room for client consultations, a surgery waiting area, a pre-adoption screening room, attended euthanasia, vendor meetings, and even a visiting

lounge for hospitalized patients. This flexibility frees other hospital areas for medical purposes (Nichols, 2000).

3.3.4.2 Central Workstation

After designating multi-purpose rooms, designers need to concentrate on organizing work flow and supplies. The appropriate organization of activities reduces the loss of time and energy. One central location functions to store frequently used supplies and handouts as well as reducing human traffic in a facility. Pet hospitals improve their efficiency with a central workstation. Mason (2000) states that designing all the rooms radiating off this central station minimizes the number of steps that staff members take (Cited in Nichols, 2000).

3.3.4.3 Communication Center

Communication centers are simple and practical to design. Developing a communication center with message boxes for each employee reduces the flow. The center located in the middle of the practice provides a box for each employee's notes to avoid interrupting their work. Chapel (1998) suggests locating a communication center near the staff lounge or reception area (Cited in Brown, 1998b).

With regard to circulation of communication, glass walls allow visual communication among associates and personnel. This improves efficiency in a pet hospital and proves crucial in emergency and critical situations (Longo, 2003). In addition, Usiak (2000) also recommends using windows and interior glass which expands space in companion animal facilities visually (Cited in Chadwick and Gurnon, 2000). Effective personnel communication is a must when running a busy hospital and efficiency is vital. Dr. Eddie Garcia (2000) says "The more limited the square feet, the more people you crowd in small areas and the higher the stress level," and adds "With limited space, you must use it creatively" (Cited in Nichols, 2000).

3.3.4.4 Flexible Reception Area

Adding walls and built-in features makes reception area rigid. On the other hand, mobile furniture let receptionists rearrange the area to suit changing needs**.** For example, if practice shifts towards more dogs and fewer cats, static waiting area starts to function as wasted space. Moveable chairs, planters, and aquariums within seating area need to be rearranged by personnel to accommodate clients. Therefore walls and built-in cabinets, stable aquariums, and planting boxes limit design options. It should not be neglected that an open reception area offers designers several options (Brown, 1998b).

3.4 Finishing Materials

Interior finishes are among the most difficult and controversial areas of pet hospital design and construction. Hamilton points out that welcoming environment for a pet hospital is mainly created by using high quality materials (Cited in Garcia, 1993). List of materials, some guidelines and limitations for their use are provided in this section. Success of these materials is proven in design and construction projects. It should not be ignored that appropriate substructure and preparation, and correct installation practices and accessories also need to be considered as well as proper material selection (Usiak, 2004). Necessary finishing materials for wall, floor and ceiling surfaces of companion animal facilities, and brief listing of room by room finishing materials take place below.

3.4.1 Interior Wall Finishes

Paint: The least expensive and easiest to apply wall finish is paint. Paint finishes range from acrylic latex and enamel to epoxy. In paint application, substrate preparation is always a key issue. Paints have the added advantage of being easily repaired or changed in color. Their major disadvantage is durability (Usiak, 2004). Paint types determined according to areas in pet hospitals take place below.

Flat Latex: It is usable in office, reception, and waiting areas where cleaning the wall is not critical and a flat. It is favorable when warmer wall finish is desired for waiting areas. It is appropriate to apply on walls as primer and one coat.

Washable Latex Semi-Gloss Enamel: It is usable throughout front and working portions of companion animal facilities however it must not be used in ward and run areas. Although this paint is washable, it is not recommended to be hosed down. Moreover semi-gloss or gloss paints show more imperfections in the wall than flat paint does.

Alkyd (Oil Base) Enamel: It is used where higher durability is required than latex enamel provides. This paint can be used in ward and run areas, therefore it is used for painting metal with careful priming and degreasing beforehand in companion animal facilities. Furthermore flat latex is acceptable to be used at base as primer coat afterward two coats of semi-gloss alkyd enamel is advised for odorless interiors.

Aliphatic Acrylic and A High-Performance Urethane Coating: It can be used on any exposed metal where subjected to harsh conditions in pet hospitals. The aliphatic acrylic coating is the most applied paint on hospital projects.

Epoxy Resin Flooring-On Walls: Epoxy resin flooring can also be used on wall surfaces if it is applied over a strong and stable sub-material like concrete block or plywood. It is very durable and impervious to liquids. When it is used on a wall and in conjunction with an adjacent floor, the epoxy resin flooring has the added benefit of creating a seamless joint where the wall and floor meet.

Epoxy Paint: This paint can be used in ward and run areas. The acrylic-epoxy water-based paint is accepted that it is very workable and durable

for most of the companion animal facilities. This product is available as water-based as well as polyester-epoxy solvent-based. Water-based product is beneficial as much as the solvent-based one. Epoxy paint is to be used over concrete block in ward areas and runs (Hafen, G. 2004).

Calcium-Hydroxide Paint: This paint is capable to turn pet hospitals into a germ-free zone shortly. This new antibacterial paint can kill 99% of bacteria and viruses within an hour of contact, for at least four years. Designers should consider calcium-hydroxide paint in their designs which is especially beneficial in air-conditioning ducts, which transmit airborne bacteria and allergens (Goldberg, 1997)

Glass Block: Glass block is used to build walls in the runs of companion animal facilities. Because the blocks are essentially a heavy glass, they are durable, resistant to staining. Moreover they are not required to be painted. They need to be grouted with epoxy grout to form joints as resistant to staining as the glass block units themselves. The only two disadvantages of glass block are the lack of glass block trim pieces to cap the ends or tops of the walls and the difficulty of mounting fencing or gates to the glass block walls. Therefore, glass blocks are recommended to be mixed with the concrete masonry units for transition and termination of the walls.

Ceramic Tile: Glazed, porcelain-finished or matte tile offers significant design flexibility. It is durable and maintenance-free material. Ceramic tile can be used in wards and runs. This material resists moisture and is available in a variety of sizes. Moreover it is used also for backsplashes at counters, wainscoting, and shower enclosures in baths in companion animal facilities (Hafen, G. 2004).

Vinyl Wall Covering and Protective Vinyl Wall Covering: Vinyl wall covering is used in front and working portions of a pet hospital. Consequently it is used instead painting in medium traffic areas. Minimum weight is required to be "Medium Duty", 400 g. per square meter. Moreover vinyl coating is required not to be less

than 217 g. per square meter. Backing should be treated with mildew and germicidal additives. In areas where are subject to staining, "Stain Resistant Type" with clear polyvinyl fluoride film needs to be used. In contrast to standard vinyl wall coverings, protective vinyl wall covering is a heavy-duty semi-rigid vinyl wall covering which is available in thickness ranging from 0,85 cm. to 7,62 cm. This material in the thicknesses which range from 1,83 cm. to 2,44 cm. is often used in companion animal facilities and it has proven to be resistant to dog scratching and scratching from portable equipment that is being moved. Protective vinyl wall coverings are usually applied directly over drywall. Furthermore in more heavy duty applications, it can be applied over plywood or particle board. Because it is flexible, it can also be formed around curves, and because it is textured, it does not show scratches (Hafen, G. 2004; Usiak, 2004).

Plastic Laminate Wall Covering: The countertop material generally referred to as "Formica" which is called plastic laminate in the construction industry. This material is often used over a plywood substructure to form a durable and visually pleasing wainscot in rooms of pet hospitals. The best way to mask scratching of animals and equipments is to use a plastic laminate which is a medium shade or patterned, rather than using a very dark or very light color. Plastic laminate is required to be mounted to plywood instead of drywall, because it can delaminate from drywall over time (Usiak, 2004).

Solid Surface Material: There are now a range of solid surface materials that look like marble and granite. Solid surface material can be used at the reception counter to create more upscale finish and to create nice, stone-like benches in waiting areas. Because this material is the same material throughout its thickness, any scratches which may occur can be polished. Gates Hafen (2004) advises designers to make use of corner guards. Since experiences show that the corner guards on walls guard against carts and dog leashes in companion animal facilities. Table 5 below shows the guidelines to use some wall finish materials designed by Wayne Usiak.

Table 5. Guidelines to Use Wall Finish Materials

(Usiak, Dec. 2004. A Materials Guide for the Veterinary Facility, *Veterinary Economics*)

MATERIAL	**GUIDELINES**
Paint on concrete block	Prime coat includes: Block filler with sealer finish coat Vinyl acrylic latex paint (normal use) Epoxy paint (wet areas)
Paint on gypsum board General: Mild moisture resistance: Wet or abrasive resistance: Contaminants (urine, etc):	 Acrylic latex semi-gloss or eggshell One part ester epoxy Two part catalyzed epoxy Polyamide epoxy chlorinated rubber moisture cureurethane
Vinyl wall coverings	Type II (Medium Density)
Sheet plastics	0,07 cm - 0,32 cm thick, 120 cm x 300 cm sheets or 120 cm rolls
Laminates	Low pressure (melamine) High pressure
Ceramic tile	Glazed, 5 cm x 5 cm, 10 cm x 10 cm, 15 cm x 15 cm, 20 cm x 20 cm

3.4.2 Interior Floor Finishes

The perfect flooring is required to have such characteristics. It must be durable; easily cleaned; resilient; nonabsorbent to liquids and odors; slip-resistant; resistant to microbial growth and it must have a pleasing visual impact. No single flooring material is appropriate for use in all areas of an animal hospital and no flooring material is a top performer in all of these categories. Therefore choosing

the "best" floor is a matter of balancing the requirements of specific areas in pet hospitals with the cost and performance of available flooring materials (Hafen, G. 2004).

Floor Tile: Floor tiles are adequate materials for front of pet hospitals. They are durable and elegant. Floor tiles are also used in working portions of the facilities however they are tiring to stand on all day. This floor material is often preferred in pet hospitals because it requires minimum maintenance. There are three main groupings of floor tiles; porcelain tile, glazed tile, and quarry tile (Hafen, G. 2004). Tile becomes a favorite material of designers since the development of porcelain with epoxy grout. Furthermore tile provides facilities with high performance and easy maintenance. G. Hafen (2004) advises designers to prefer ceramic tile for baths and runs of companion animal facilities. When ceramic tile is decided to be applied, it must be checked for slip resistance and durability. Before installing any type of tile, it should be insured that the sub-floor does not flex.

Vinyl Composition Tile: Vinyl composition tile is satisfactory in all areas and inexpensive material for the front and working portions of the facilities. It is also frequently used in human health care facilities. Vinyl composition tile is probably the most inexpensive and durable flooring material. They are crack-able and curl-able. Edges may break under pressure. On the other hand, they can be replaced easily. Joints of this material are not chemically bonded or heat welded. Frequent waxing is required to keep the joints sealed. Gates Hafen (2004) points out that the new generation of vinyl composition tiles is asbestos free.
Vinyl composition tile is an admirable economy performer for companion animal facilities (Usiak, 2004).

Sheet Vinyl: Sheet vinyl is a convenient material for using in the working portions of the companion animal facilities. It is very durable and cleanable. For pet hospitals, commercial grade 2,4 cm. thick homogeneous PVC sheet vinyl flooring must be preferred. It has no specific wear layer however it has pattern and material consistent through the product. G. Hafen (2004) states that In the past

few years, there has been a change in the type of adhesives used to glue this product. The new adhesives are much more sensitive to the presence of water coming through the product. Therefore, it is essential that a moisture test is done before applying this material. According to Usiak (2004), sheet vinyl products are used most often in companion animal facilities since they deliver superior performance at a reasonable cost.

Carpet: This material is a favorable material only for front of pet hospitals. It needs regular professional cleaning. Carpet is often used in the office and behind the reception desk. Nylon or new generation soil-resistant, nylon-like products are probably the best choice for combined wear and soil resistance. A continuous filament and synthetic backing are required for carpet which will be used in companion animal facilities. The circulation rating is recommended to be "Heavy or Extra Heavy". The carpets are required to be "commercial" quality, not "residential". Moreover carpets must be glued down without a pad. In addition, carpet tiles are also a viable alternative so that stained sections can be replaced easily (Hafen, G. 2004).

Liquid Applied Epoxy and Liquid Applied Acrylic Resin Flooring: Liquid applied epoxy is used in procedure and run areas of pet hospitals. Sealers or wax is not needed for this material which is easily cleaned. Epoxy resin flooring is an ideal material for animal healthcare facilities as well. It can be applied up the wall as a base or wainscot. It is important that surface preparation is critical when applying liquid applied epoxy. The floor must be smoothed. Furthermore, improper installation and under-slab water penetration can cause serious adhesion and blistering problems. G. Hafen (2004) points out that liquid applied acrylic resin flooring is also used in procedure and run areas. It is easily cleaned and sealers or wax is not needed for this material as well. This material chemically bonds to concrete. Because it is acrylic based, it has no poisonous gassing problems. In addition, unlike the epoxy flooring, the acrylic resin flooring forms a monolithic, chemical bond between layers. G. Hafen (2004) indicates that even after years, new or additional coatings may likely be installed with integrated surfaces. It

should not be ignored that poured floors are usually good performers at a premium cost however they extremely depend upon applicators' proficiency (Usiak, 2004). Similar to the sheet vinyl products, epoxy and acrylic resin floors are very sensitive to moisture in the concrete floor to which it is bonded. For this reason, it is essential that a moisture test needs to be done before using this material in pet hospitals (Hafen, G. 2004).

Stained and Sealed Concrete: This material is convenient to use throughout the companion animal facility. It is a relatively alternative to a tiled floor. Designers have an advantage to create an "antic roman" type of spotted or aged-looking floor with using stained and sealed concrete. This material requires resealing every few years, depending on the circulation in the facility. Usiak (2004) states that sealed concrete is a floor material which is an exceptional economy performer. According to experts, painted concrete floors fail in existing companion animal facilities. They would strongly recommend against using any kind of paint on floors, even chlorinated rubber, alkyd enamel, or epoxy (Hafen, G. 2004).

Terrazzo: Terrazzo is usable in all portions of pet hospitals. It is both highly durable and very visually appealing however it can be tiresome to stand on during daytime. It must be kept in mind that terrazzo becomes slippery when it is wet. Because of the cost, it is rare to find terrazzo floor finishes which are being used in current companion animal facilities (Hafen, G. 2004). Table 6 below shows the guidelines to use some floor finish materials designed by Wayne Usiak.

Table 6. Guidelines to Use Floor Finish Materials

(Usiak, Dec. 2004. A Materials Guide for the Veterinary Facility, *Veterinary Economics*)

MATERIAL	**GUIDELINES**
Vinyl composition tile	30 cm x 30 cm Many joints Durable Requires stripping/waxing
Sheet Vinyl Covable, non-weldable Covable, weldable Covable, weldable, cushioned	 Vinyl (seams) PVC (seamless) 180 centimeters wide rolls most require waxing PVC (seamless)
Ceramic, quarry tile	Use epoxy grout; 10 cm x 10 cm, 15 cm x 15 cm, 20 cm x 20 cm; can be slippery
Carpeting	Solution dyed, anti-microbial 360 cm rolls
Porcelain Tile	Use epoxy grout matte finish, non-slip 20 cm x 20 cm best size, 30 cm x 30 cm available cove base trim available
Epoxy Grout	Urine resistant
Base Vinyl Rubber Vinyl, weldable	 Industry standard 120 cm or rolls less Shrinkage than vinyl 120 cm lengths Solvent welded, minimal color selection
Poured Epoxy Floors Hallemite HEF Silikal	 0.3 cm shelf leveling quartz epoxy MMA compound, anti-microbial

3.4.3 Interior Ceiling Finishes

Usiak (2004) points out that the majority of ceilings in pet hospitals are gypsum board or acoustic lay in tile whereas painted drywalls are inadequate and used rarely. Moreover ceiling systems need to consist of moisture-resistant gypsum board, latex paint or high-build coating and sealant at intersections with walls and openings to guarantee air and water tightness (Stark, 2003). Leaving ceilings as painted drywall is not a right decision. Since this does not allow flexibility or immediate access to space above ceiling. Moreover lack of acoustical absorption may occur as a problem (Hafen, G. 2004). The most suitable ceiling materials for pet hospitals take place below.

Gypsum Board: Gypsum board ceilings provide a hard, durable and paintable surface for hospitals. Usiak (2004) recommends designers to use this material if they solve noise problems which may occur accordingly. Although these ceiling systems block the sound which is leaving the room, they echo and increase sound within the room.

Suspended Acoustic Tile: Acoustical tile ceilings are suspended in a metal grid hung by wires from the building structure. Usiak (2004) states the advantages of acoustical tile ceilings are sound absorbency and accessibility of everything above the ceiling by removing any tile. Patterned, molded, or high-profile tiles are convenient materials for using in the public areas of pet hospitals. In the working areas of hospitals, high-profile tile which has higher sound absorbing abilities (noise reduction coefficient of .75 to .80) is a convenient material to use. Economical tile may be used on ceilings of high-moisture areas, such as runs and grooming. These tiles include vinyl faced or perforated ceiling panels. In high-humidity areas, the size of the tile must be minimized to resist sagging. Tiles with sealed edges and special back coatings must be preferred by designers to create clean-room ceilings, such as surgery areas (Hafen, G. 2004). Sound absorbing materials for ceilings of a pet hospital include spray-on acoustic sound absorbing material, sound absorbing wall panels and free-hanging sound baffles.

Spray-On Acoustic Sound Absorbing Material: This material available in two types; cellulose and cementitious. The cellulose materials provide facilities with a noise reduction coefficient of 1.0 however they are not very durable. Therefore they would not be recommended by authorities except for rare occasions (Hafen, G. 2004). These tiles perform well in stopping sound transmission. Moreover they are sound absorbent. Conversely their biggest disadvantages are moisture absorption and weakness (Usiak, 2004). Cellulose materials are very porous. Therefore they absorb airborne moisture, organisms, or dirt. On the other hand, the cementitious spray-on materials provide companion animal facilities with a NRC of only .55 to .65. Furthermore they are durable materials and they resist rough conditions even hosing (Hafen, G. 2004). These tiles are typically with a washable vinyl face. From the view point of Usiak (2004), they are sound absorbers and can be hosed and scrubbed without absorbing moisture. They are less designer-oriented than mineral fiber tiles.

Sound Absorbing Wall Panels: These materials include cloth-or vinyl-wrapped sound absorbing units (noise reduction coefficient of .85). They are possible to be used in any area requiring additional sound absorbing abilities. They should not be installed below between 120 cm. and 0 cm. in ward and run areas of pet hospitals.

Free-Hanging Sound Baffles: Free-hanging, nylon-faced or vinyl-faced sound baffles reduce sound in both the public and run areas of the facility. When these baffles are being hung from the ceiling or around the walls in a variety of configurations, they provide a sound control and a visual interest in a pet hospital (Hafen, G. 2004). Table 7 below shows the guidelines to use some ceiling finish materials designed by Wayne Usiak.

Table 7. Guidelines to Use Ceiling Finish Materials

(Usiak, Dec. 2004. A Materials Guide for the Veterinary Facility, *Veterinary Economics*)

MATERIAL	**GUIDELINES**
Gypsum board	Acrylic latex paint, flat
Acoustical tile	
Mineral fiber	Appearance tile NRC: .50 - .60 STC: .35 - .39 LR1 (light reflectance) 60 cm x 120 cm or 60 cm x 60 cm
Fiberglass	NRC: .75 - .95 LR1 (light reflectance) washable vinyl face, use in wet areas 60 cm x 120 cm
Wood	2.5 cm x 15 cm, 2.5 x 10 cm, usually tung & grove aspen, cedar, pine

3.4.4 Room by Room Finishing Materials

Selection of materials and finishes is one of the most important aspects of the design of animal medical facilities. List of materials takes place below does not designate the "best product" for any particular application. Moreover the list does not contain each product available for every situation. The Table 8 indicates products or finish options which have proven successful for more than 22 years of animal hospital design and in more than 280 successful animal hospitals projects. The checklist of suggested materials for planning a pet hospital is designed by Dan Chapel with regard to the sections of the facility.

Tables 8. The Checklist of Suggested Materials for Planning a Pet Hospital

(Chapel, Dec. 2004. Finish Materials for Veterinary Hospitals, *Veterinary Economics*)

ROOM-BY-ROOM LISTING OF MATERIALS AND FINISHES		
ROOMS		**MATERIALS**
Entrance	**Entry Floors**	Quarry tile (traction surface) with epoxy grout
		Sheet vinyl (minimum .080 gauge)
		Ceramic tile (traction surface) with epoxy grout
	Entry Base	Quarry tile (traction surface) with epoxy grout
		Rubber base
		Ceramic tile (traction surface) with epoxy grout
		Cove sheet vinyl base
	Entry Walls	Gypsum board with painted surface
		Gypsum board with Type II (Medium density) vinyl wall covering
	Entry Ceiling	Lay-in type acoustical ceiling system (1.6 cm acoustical panels and steel grid)
ROOMS		**MATERIALS**
Waiting Area	**Waiting Floor**	Quarry tile (traction surface) with epoxy grout
		Sheet vinyl (minimum 0.2 cm gauge)
		Ceramic tile (traction surface) with epoxy grout
	Waiting Base	Quarry tile
		Rubber base
		Ceramic tile
		Cove sheet vinyl base
	Waiting Walls	Gypsum board with painted surface
		Gypsum board with Type II vinyl wall covering
	Waiting Ceiling	Lay-in type acoustical ceiling system (1.6 cm acoustical panels and steel grid)
ROOMS		**MATERIALS**
Reception Area	**Receptionist Floor**	Sheet vinyl (minimum 0.2 cm gauge)
		Carpet
	Receptionist Base	Rubber base
	Receptionist Walls	Gypsum board with painted surface
		Gypsum board with Type II (Medium density) vinyl wall covering
	Receptionist Ceiling	Lay-in type acoustical ceiling system (1.6 cm acoustical panels and steel grid)

Table 8. (cont.)

ROOM-BY-ROOM LISTING OF MATERIALS AND FINISHES		
ROOMS		**MATERIALS**
Exam Room	**Exam Room Floor**	Quarry tile (traction surface) with epoxy grout
		Sheet vinyl (minimum 0.2 cm gauge)
		Ceramic tile (traction surface) with epoxy grout
	Exam Room Base	Quarry tile
		Rubber base
		Ceramic tile
		Cove sheet vinyl base
	Exam Room Walls	Gypsum board with painted surface
		Gypsum board with Type II (Medium density) vinyl wall covering
	Exam Room Ceiling	Lay-in type acoustical ceiling system (1.6 cm acoustical panels and steel grid)
ROOMS		**MATERIALS**
Pharmacy And Lab.	**Pharmacy And Lab. Floor**	Sheet vinyl (minimum 0.2 cm gauge)
		Carpet
	Pharmacy And Lab. Base	Rubber base
	Pharmacy And Lab. Walls	Gypsum board with painted surface
	Pharmacy And Lab. Ceiling	Lay-in type acoustical ceiling system (1.6 cm acoustical panels and steel grid)
ROOMS		**MATERIALS**
Treatment Room	**Treatment Room Floor**	Sheet vinyl (minimum 1.6 cm gauge)
		Carpet
	Treatment Room Base	Rubber base
	Treatment Room Walls	Gypsum board with painted surface
	Treatment Room Ceiling	Lay-in type acoustical ceiling system (1.6 cm acoustical panels and steel grid)

Table 8. (cont.)

ROOM-BY-ROOM LISTING OF MATERIALS AND FINISHES		
ROOMS		**MATERIALS**
Pack/Scrub Area	**Pack/Scrub Area Floor**	Sheet vinyl (minimum 0.2 cm gauge)
	Pack/Scrub Area Base	Rubber base
	Pack/Scrub Area Walls	Gypsum board with painted surface
	Pack/Scrub Area Ceiling	Lay-in type acoustical ceiling system (1.6 cm acoustical panels and steel grid)
ROOMS		**MATERIALS**
Surgery	**Surgery Floor**	Sheet vinyl (minimum 0.2 cm gauge)
	Surgery Base	Rubber base Cove sheet vinyl base
		Cove sheet vinyl base
	Surgery Walls	Gypsum board with painted surface
	Surgery Ceiling	Gypsum board with painted surface
		Lay-in type acoustical ceiling system (1.6 cm acoustical panels and steel grid)
ROOMS		**MATERIALS**
Radiology	**Radiology Floor**	Sheet vinyl (minimum 0.2 cm gauge)
	Radiology Base	Rubber base
	Radiology Walls	Gypsum board with painted surface
	Radiology Ceiling	Lay-in type acoustical ceiling system (1.6 cm acoustical panels and steel grid)

Table 8. (cont.)

ROOM-BY-ROOM LISTING OF MATERIALS AND FINISHES		
ROOMS		**MATERIALS**
Ward/Bathing	**Ward/Bathing Floor**	Sheet vinyl (minimum 0.2 cm gauge) with central floor drain
	Ward/Bathing Base	Rubber base
	Ward/Bathing Walls	Concrete block with epoxy painted surface
	Ward/Bathing Ceiling	Lay-in type acoustical ceiling system (1.9 cm acoustical panels and aluminum grid) with 15 cm sound attenuation batts plus thermal insulation batts
ROOMS		**MATERIALS**
Run/Isolation	**Run/Isolation Floor**	Finish concrete with hardener-sealer treatment (clear)
		Finish concrete with sealer treatment (clear)
		Finish concrete with integrally stained concrete surface (colored) with sealer treatment
		Finish concrete with surface stained concrete surface (colored) with sealer treatment
		Quarry tile (traction surface) with epoxy grout
		Ceramic tile (traction surface) with epoxy grout
		Porcelain tile (traction surface) with epoxy grout
		Trowel-on floor (Ceramic Carpet)
	Run/Isolation Base	None
		Quarry tile (with quarry tile floor only)
		Ceramic tile (with ceramic tile floor only)
		Porcelain tile (with ceramic tile floor only)
		Trowel-on floor (Ceramic Carpet)
	Run/Isolation Walls	Concrete block with epoxy painted surface (non-latex)
	Run/Isolation Ceiling	Lay-in type acoustical ceiling system (1.9 cm acoustical panels and aluminum grid) with 6" sound attenuation batts plus thermal insulation batts
		Lay-in type acoustical ceiling system (1.6 cm vinyl coated fiberglass panels and aluminum grid) with 6" sound attenuation batts plus thermal insulation batts

Table 8. (cont.)

ROOM-BY-ROOM LISTING OF MATERIALS AND FINISHES		
ROOMS		**MATERIALS**
Storage	**Storage Floor**	Sheet vinyl (minimum 0.2 cm gauge)
	Storage Base	Rubber base
	Storage Walls	Gypsum board with painted surface
	Storage Ceiling	Lay-in type acoustical ceiling system (1.6 cm acoustical panels and steel grid)
ROOMS		**MATERIALS**
Staff/Lounge	**Staff/Lounge Floor**	Sheet vinyl (minimum 0.2 cm gauge)
	Staff/Lounge Base	Rubber base
	Staff/Lounge Walls	Gypsum board with painted surface
		Gypsum board with Type I (Light density) vinyl wall covering
	Staff/Lounge Ceiling	Gypsum board with painted surface
		Lay-in type acoustical ceiling system (1.6 cm acoustical panels and steel grid)
ROOMS		**MATERIALS**
Doctor's/Business Office	**Doctor's/Business Office Floor**	Sheet vinyl (minimum 0.2 cm gauge)
		Carpet
	Doctor's/Business Office Base	Rubber base
		Wood Base
	Doctor's/Business Office Walls	Gypsum board with painted surface
		Gypsum board with Type I (Light density) vinyl wall covering
	Doctor's/Business Office Ceiling	Lay-in type acoustical ceiling system (1.6 cm acoustical panels and steel grid)

CHAPTER 4

CONSIDERATIONS WHEN DESIGNING A PET HOSPITAL

When designing veterinary facilities, designers face several zones which define the basic sections of the facility. With regard to pet hospitals, R. Hafen (1999) describes these zones into three main areas which are; client areas, procedural areas, and patient areas (Hafen, R. 1999). An each part of the pet hospitals needs to be designed considering these zones. In addition, E. John Knapp (2000) also focuses on three main areas of veterinary facilities. He states these zones the "greeting zone," the "working zone," and the "dwelling zone" (Knapp, 2000). Although the names given to the zones differ from author to author, they configure the same areas in companion animal facilities. The zones help defining the components of a pet hospital as well as developing ideas, suggestions and solutions to the design problems. This section presents considerations consistent with the main zones of a pet hospital.

4.1 The Greeting Zone

This zone consists of all areas related with clients. The greeting zone could be called client areas as well. Pet owners get the best impression about the hospital in these places. The greeting zone usually consists of the areas defined below.

4.1.1 Entry

Entrance takes place at the beginning of the design considerations. As clients drive up to the curb in front of the facility, they start to form opinions about the way to practice medicine and care for animals. Clients evaluate the way the facility looks from the street and they evaluate the way it looks as they walk up to the building. Therefore the design of entrance is not less important than other sections in this zone. The curb appeal (the first impression of a building as seen from the street) is a significant considering for designers. With regard to entry of a companion animal facility, designers need to take into account the fact that there are two considerations which make the facility accessible. They are express check-in and emergency care entrance (Hafen, R. 1999).

Express Check-In: One way to make a veterinary practice accessible is to provide express check-in. The idea is to meet the client at the curb or at his or her car to assist them with the pet quickly and graciously. In urban areas valet parking might be provided as well (Hafen, R. 1999). Alternatively, Knapp (2000) suggests separating check-in and checkout areas. According to Knapp, it should be considered that staff members need an easy path through these areas because they often must come out from behind the desk to help clients. Moreover clients and their pets also need enough room to maneuver.

Emergency Care Entrance: Providing a separate emergency entrance is another way to make companion animal facility more accessible. By separating out the emergency cases, confusion and conflict which may occur in the conventional reception area are eliminated. Designers must also avoid sending the message to clientele who do not have a crisis and who are not valued as much as emergency care case which receives preferential treatment. Conceivably more important, a separate entrance eliminates the chance of waiting clients being confronted by the sight of a seriously injured animal and its traumatized owners on the way to treatment (Hafen, R. 1999).

4.1.2 Reception Area

Although the client experience begins at the curb, the first defining moment occurs when the receptionist greets the client. This moment sets the stage for all the other interactions which will take place during the client's visit. Hamilton (1993a) states that reception area and waiting room is the centre of first impressions. Clients are usually anxious about the welfare of their pets. Therefore waiting rooms are necessary to be designed soft and welcoming. Hamilton mentions that materials which are below waist height needs to be taken into consideration because these materials are likely to be clawed or urinated on (Cited in Godfrey, 1993). It would be more convenient that designers arrange chairs in reception area in a similar approach to the chairs in airport waiting areas. This consideration results in a neater appearance while it makes cleaning and moving chairs easier. Storage is an important subject matter in the reception area for the staff's point of view. R. Hafen (1999) suggests designers to provide more storage area by designing rotating file shelving cabinets which pivot on a center point. This would provide the staff to access to a second and different filling unit. This approach effectively doubles file storage in the reception area.

Function-Specific Reception Desk: Most of the bigger and large reception desks create non-functional areas where the client does not know where to stand. For this reason, designated workstations are advised in order to create function-specific reception desk. A designated workstation provides personnel with all their equipment, phones, credit-card machines, forms, and even pencils at their fingertips. Moreover, "the desk provides clients with a hook to attach a leash, a place to set a purse or write a check, and a point of purchase retail display much like check-out lanes in stores" (Hafen, R. 1999, 192). Therefore function-specific reception desk cuts down unnecessary commotion, decreases transaction time and increases client satisfaction.

Welcome Desk: Some companion animal facilities now make use of "Welcome nurses". These technicians meet every client either at the curb or as they come in through the door. "These welcome nurses stay with the client, help them with the animal, besides they help fill out forms if necessary, and assist in the exam room" (R. Hafen, 1999, 192). In addition, R. Hafen (1999) advises using welcome desks if properly designed. Thus the welcome desk could replace the traditional reception counter.

Welcome Workroom: Instead of designing an impressive reception desk, designers may also create a small, free-standing greeter's desk with immediate accessibility to exam rooms and the waiting area (Hafen, R. 1999). The hospital manager's office is supposed to be close to this work room. Furthermore, "this arrangement eliminates the confusion and messiness of a reception desk in the waiting area" (Hafen, R. 1999, 193).

4.1.3 Waiting Room

According to Hamilton (1993b), the waiting room provides the client's first impression of veterinarian's practice. In this manner, designers need to create a welcoming environment in the waiting room by using high quality materials, attractive color schemes, comfortable seating, and various amenities (Cited in Garcia, 1993).

Designing alcoves off of a central waiting area provides a pet hospital with separate, definable areas for cat and dog without dividing the room into separated compartments (Figure 1). This approach causes clients not to feel boxed in or isolated. Thus the pets feel themselves more secure in these areas. In addition, designers have a chance to draw cat owners to a charming, secure zone within the waiting area itself by creating a defined cat area "Cat Pavilion" which is like a little gazebo or pavilion. Furthermore "the cat pavilion adds interest and a unique quality to the clients' experience" (Hafen, R. 1999, 95).

Stacey L. Taylor (2002), states that twenty four percent of well-managed practices in United States offer separate canine (dog) and feline (cat) seating areas. Chapel (2002) puts forward opinions about separate seating as well. Dan Chapel says "Arranging separate seating is more critical if clients often complain about other pets disrupting their wait." A wall, a refreshment counter, or a retail area may provide the necessary separation for cats and dogs. Chapel (2002) includes "Keep in mind, the distance between the areas doesn't have to be huge to accomplish your goals". He says "You just need to provide a safety zone and block the view of other pets." Moreover Chapel suggests designers to give clients several seating options. Chapel says "For example, I might design seating that features several small nooks" (Taylor, 2002). Therefore waiting alcoves may provide the feeling of security without the pet owner being isolated in a separate room. Since the alcoves are not labeled "cat" or "dog," they would be flexible to meet clients' needs.

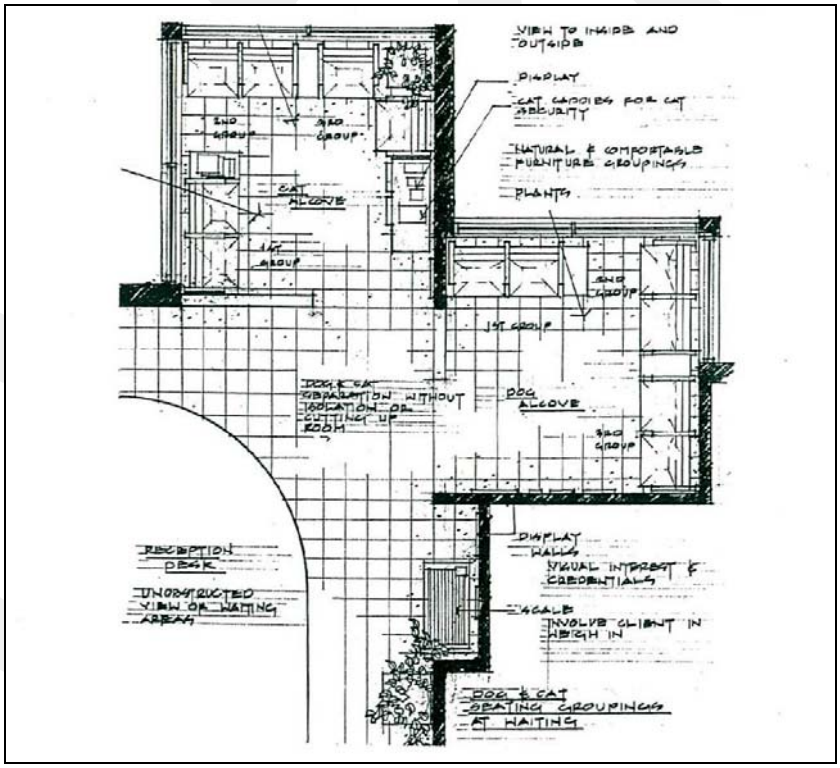

Figure 1. Waiting Alcoves for Cat and Dog Owners

(Hafen, R. Mark. 1999. More Design Innovations, *Designing the Future*, Veterinary Medicine, Kansas Pub., p. 97)

Knapp (2002), states that another consideration is to use portable furniture to define separate waiting areas. Consequently this approach provides maximum flexibility while letting the personnel change the arrangement according to clients' needs. It must be kept in mind that designating which area is for dogs and which is for cats is not a must.

Dr. Cloud (2002) supports a different view considering separate dog and cat waiting areas. Cloud thinks that clients should not be forced into an assigned area. He suggests designing modular seating areas which offer various distinct waiting areas. "Although this approach requires more space than two clearly defined areas, it gives clients with shy or rowdy pets more options if they want to separate their animals from other pets" says Cloud (2002). With regard to separate seating areas, Cloud confirms that there are no disadvantages to separate dog and cat seating areas since it offers clients more convenience (Taylor, 2002).

4.1.4 Exam Room

Knapp (2000) considers exam room as a part of the greeting zone. According to Knapp (2000), clients spend most their time there. R. Hafen (1999) states that the exam room is central to the whole client experience. It is approved that, although the medical care which clients' pets receive in the treatment area and other medical areas of the facility is critical, clients do not experience this directly but in exam rooms. "In the typical veterinary facility, clients are expected to judge the medical effectiveness of the doctor based on the doctor's bedside manner in the exam room" (Hafen, R. 1999, 194).

Often the capacity of a veterinary facility is discussed in terms of number of exam rooms. A typical rule of thumb is one exam room for about 1200 square feet of building area. The goal in developing exam room concepts is threefold:

1. To make the exam rooms function more effectively
2. To group the exam rooms so that they use less space
3. To create exam rooms which could flex to accommodate multiple uses

With regard to these goals, designers may develop exam rooms for pet hospital projects. Exam room models vary according to different concepts such as exam rooms with regard to their walls, exam rooms with regard to their doors and exam rooms with regard to their function. These exam room concepts are presented below.

One Door Exam: **"**Beginning in the late 1960s, the two door exam room became the norm for the veterinary industry" (Hafen, R. 1999, 194). R. Hafen states that, although a "back way out" type of an exam room is favorable, the necessity of two doors is often overestimated. According to him (1999), almost 80 percent of the medical care which is provided in a typical practice is out-patient care. But this reduces the importance of the rear exam room door, because the animals are not being admitted to the facility (Hafen, R. 1999). Animals are exiting the same way they entered. In addition to this, by designing one way exam rooms, designers may improve the space efficiency of a typical facility (Figure 2).

Two Door Exams: Knapp (2000) defines an ideal exam room as two door exam room. He recommends designing an 8-by-12-foot standard exam room with two doors. According to Knapp (2000), the door which pet owners use needs to open to seating, and the door which is for doctors should lead to the sink, supplies, and workstation for space efficiency (Figure 3).

The Exam-Pod Concept: The exam pod concept has been used in various configurations by the human medicine design community for several years. Basically the idea is to group the exam rooms into pod of three or four (Figure 3). Grouping the exam rooms into pods rather than in the more typical lines of exam rooms decreases space requirements and increases the doctors' efficiency and thereby their billing ability. By using the pod concept, designers have an

opportunity to nearly double the number of exam rooms which a companion animal facility can accommodate. The pod concept is particularly effective for out-patient care. The exam-pod concept intimately matches the way a doctor and a technician team works when using high-density scheduling. "In high-density scheduling, a team member prepares one room while VMD (veterinary medical doctor) uses the second room and a technician closes a visit in the third room" (Hafen, R. 1999, 195). Designers could locate a mini-lab, pharmacy and a charting area adjacent to the exam rooms but still within the pod. Figure 2 presents how the one door exam, the exam pod and the ready room concepts fit together to create an efficient outpatient medicine module.

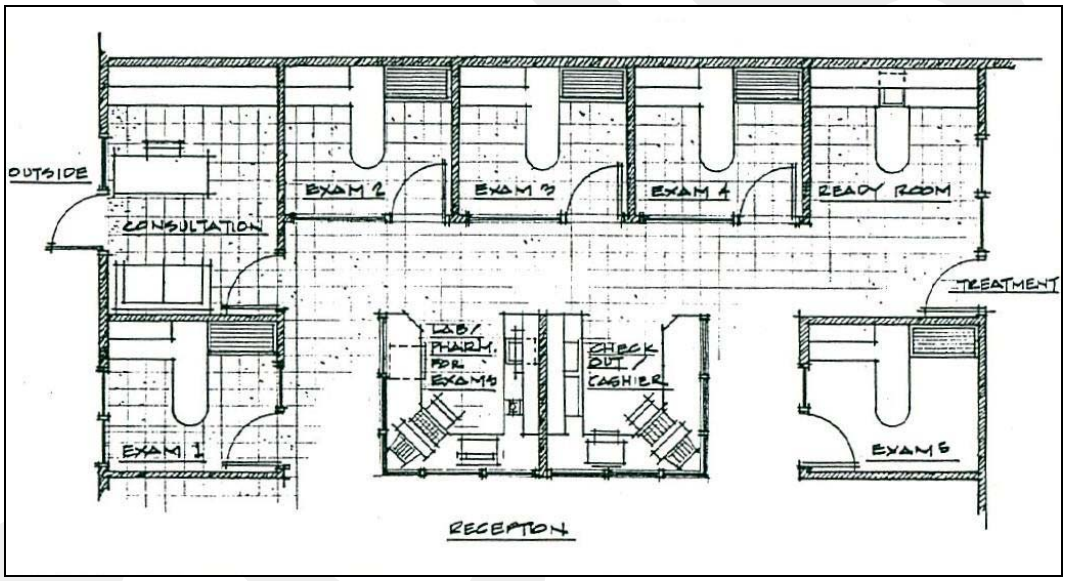

Figure 2. One Door Exam, the Exam Pod and the Ready Room Concepts in a Medicine Module

(Hafen, R. Mark. 1999. A Menu of Design Solutions, *Designing the Future*, Veterinary Medicine Pub., Kansas, p. 196)

Multi-Task Exam Rooms: In multi-task exam room concept, the exam rooms function as a typical exam room during busy times and as a treatment station in off periods. Considering the way the typical clinic uses its exam and treatment spaces, it is observed that when the exam rooms are busiest at the beginning or

end of the day, the treatment room is the slowest. On the other hand, when the treatment area is busy during the middle of the day the exam rooms are often vacant. Regarding the multi task exam room concept, the solid rear wall of the room is eliminated. In place of this solid and inflexible rear wall, designers need to use a glass partition which can be folded out of the way. Instead of a typical exam table, the working station must be replaced with a multi-use tub/table. Designers should also provide more room for storage of equipment and supplies in the cabinets. "With the folding wall closed the room functions as a normal exam room. It is larger and has got more equipment in it. With the folding wall open, the exam room becomes a treatment alcove" (Hafen, R. 1999, 196). Figure 3 combines two door exams, the exam-pod and multi task exam concepts which allow the rearmost exam rooms open directly into the treatment area.

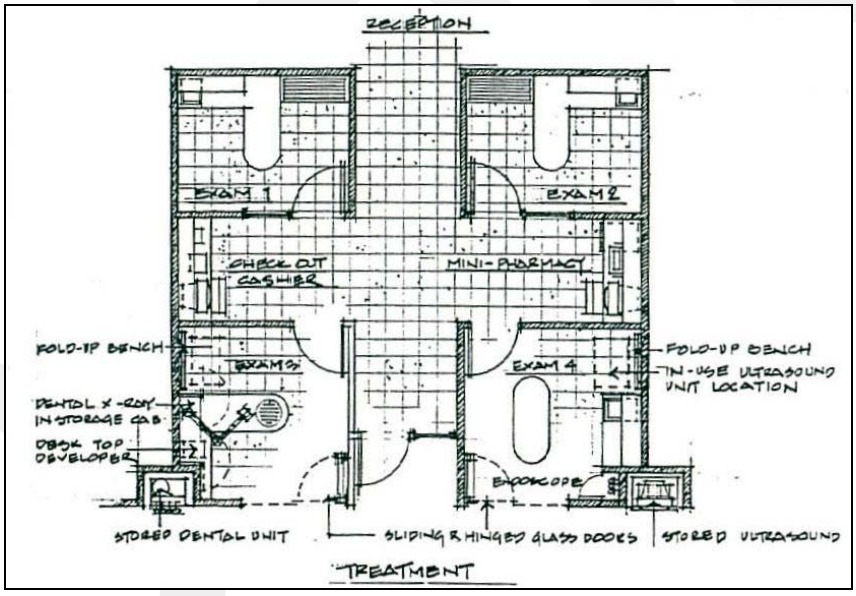

Figure 3. Combination of Two Door Exams, the Exam-Pod and Multi Task Exam Concepts

(Hafen, R. Mark. 1999. A Menu of Design Solutions, *Designing the Future*, Veterinary Medicine Pub., Kansas, p. 195)

Ready Room: In combination with a pod concept for outpatient care, it is recommendable to create a read room, or miniature out-patient treatment room immediately outside the pod (Hafen, R. 1999). Minor medical procedures are done in this area instead of being brought back into the commotion of the in-patient treatment area. This also works well with high-density scheduling. R. Hafen (1999) points out that in the ready room, the technician quickly performs minor procedures on the patient while the doctor goes on to the next exam room. "The client awaits the return of his or her pet in the waiting area, freeing the room for the next client" (Hafen, R. 1999, 197). Designers also can include some lab equipments in their ready room design. Moreover, keeping equipment in the ready room can help eliminate some items from the exam room (Figure 2).

Adopting the Pediatric-Exam Model: In human pediatric medicine, the typical exam room combines an exam counter with parents' seating and a doctor's desk along adjacent walls. Moreover any of these items does not protrude out as a peninsula and dominate the room. Thus, "the floor space is free for circulation, and the seating arrangement minimizes the 'us versus them' mentality which comes with being across a desk or across the room" (Hafen R. 1999, 199). For adapting the pediatric exam room to the veterinary field, designers need to alter their plan to include a roll-out exam counter which a VMD and a client can gather around. Figure 4 shows pediatric-exam model with a desk in the consultation corner, a bookshelf in the information/education corner and an exam table and "meds" counter in the medicine corner.

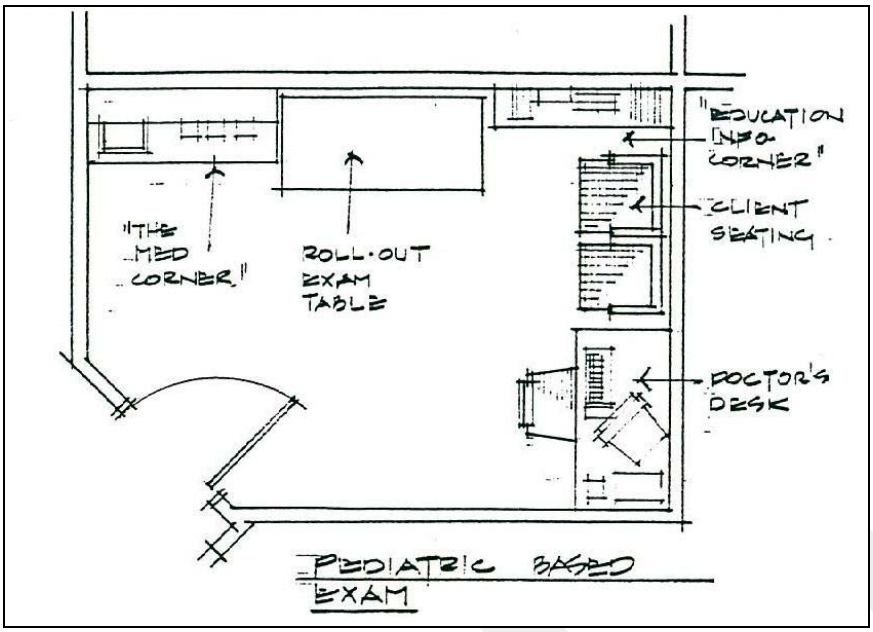

Figure 4. Pediatric Exam Model for Pet Hospitals

(Hafen, R. Mark. 1999. A Menu of Design Solutions, *Designing the Future*, Veterinary Medicine Pub., Kansas, p. 199)

Designers should also design exam rooms according to the position of walls surrounding the room as well. The walls of an exam room are also significant to determine working and efficiency of the room. This exam room concept would be applied in three ways; one-wall exam room, two wall exam room and exam rooms without walls.

<u>One –Wall Exam Room:</u> In one-wall exam room, the cabinets, benches, and an exam table are designed to be mounted to one long wall (Hafen, R. 1999). The underlying concept is to create a room which is friendly to the client as well as space efficient. Moreover this design concept provides doctors not to turn their backs on the client or the patient even when they wash their hands. This approach is especially practical whereas a doctor is dealing with an aggressive animal with a client. In addition, one-wall exam room provides the client to sit on the bench and keep one hand on the animal. Otherwise the animal may use the bench in place of a springboard to get onto the table (Hafen, R. 1999). Figure 5 shows an example of one-wall exam room.

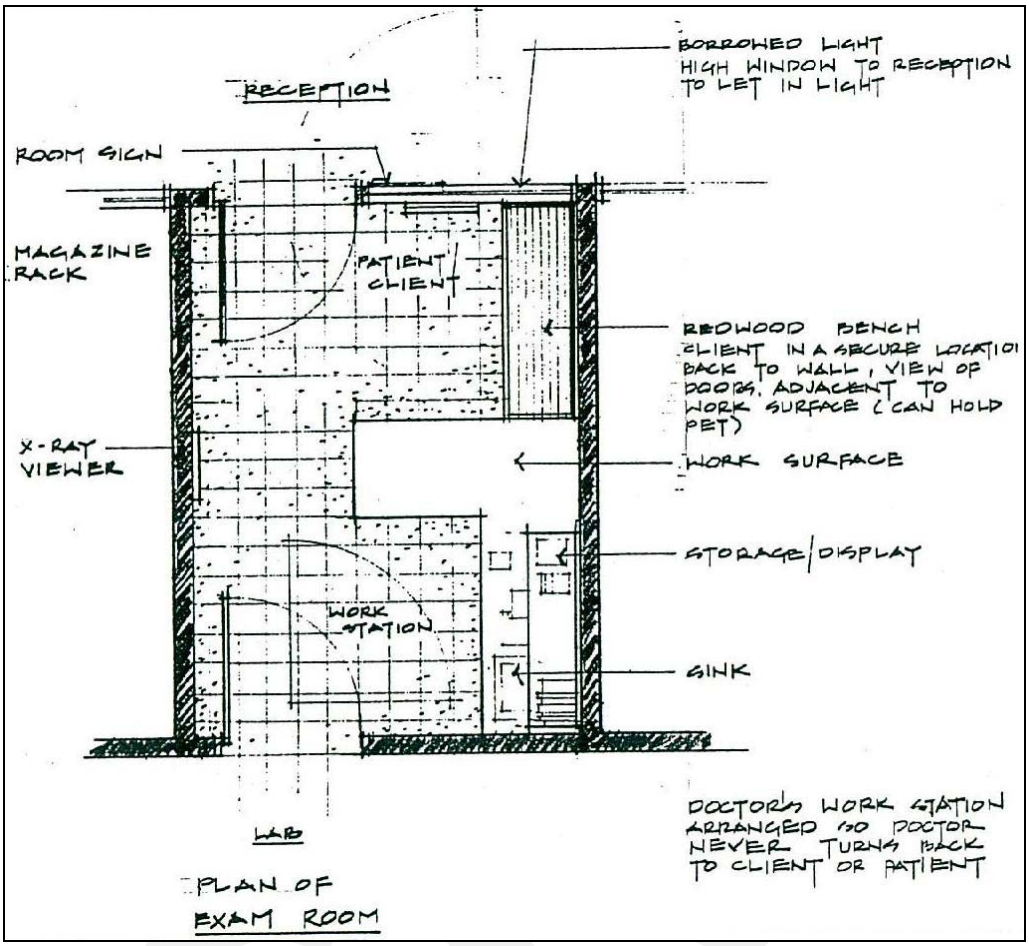

Figure 5. An Example of One-Wall Exam Room

(Hafen, R. Mark. 1999. More Design Innovations, *Designing the Future*, Veterinary Medicine Pub., Kansas, p. 94)

Two-Wall Exam Rooms: One-wall exam rooms are used since they are space effective and client friendly. However there are many companion animal facilities which have computer data entry stations in their exam rooms. With regard to this concept, one-wall exam room is expanded to include a second wall of cabinets on the opposite side of the room that accommodates both a computer and an expanded client education and information center (Hafen, R. 1999). According to R. Hafen (1999), this design consideration reflects a design trend toward greater flexibility. Exam rooms are advancing into multipurpose rooms which serve as education centers while performing traditional functions. An example of a two-

wall exam room is presented in Figure 6. The second wall of this exam room is dedicated entirely to client education and data entry.

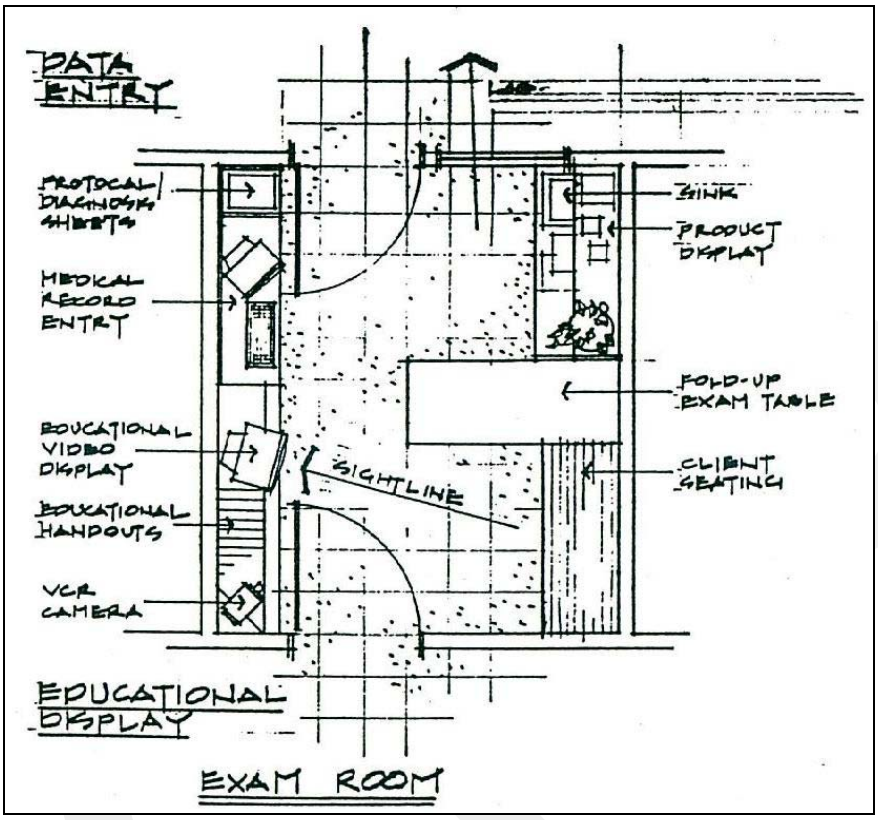

Figure 6. An Example of Two-Wall Exam Room

(Hafen, R. Mark. 1999. The Million-Dollar Clinic, *Designing the Future*, Veterinary Medicine Pub., Kansas, p. 122)

Exam Rooms without Walls: It is rational to incorporate glass walls between the waiting area and the exam rooms. The goal of this consideration is to eliminate the closed-in feeling common to most exam rooms (Hafen, R. 1999). From the view point of R. Hafen (1999), eliminating walls in exam rooms provides a theatre which keeps waiting clients entertain in the waiting area.

Consequently, examination rooms must not be designed to be used for surgical procedures, radiology or in-patient treatment (Cited on the website of VSBSA,

2003). Alternatively, examination rooms in a pet hospital may also be used as an out-patient treatment area. The examination room where physical examination of animals is done needs to be well lit, large enough for a veterinarian to examine an animal conveniently with a client present in the area, together with any necessary (and at least one) assistant and the required equipments (Cited on the website of CVO, 2004).

4.1.5 Consultation Room

Designers have an opportunity to reduce the circulation in doctor's office by designing a client consultation room adjacent to exam rooms. This special room which is furnished like an office provides doctors and personnel with a private place to discuss difficult cases or a place for clients to watch educational tapes and visit their hospitalized animals (Figure 7). Veterinary practitioners spend their day mostly in the consulting room. This area must be ensured to be designed comfortable (Garcia, 1993). Godfrey confirms the same point of view. He (1993) points out that the consulting room is where veterinarians spend much of their professional life. Therefore this rooms needs to be designed pleasant and functional. In addition, consultation rooms may be designed to be accessible to and from the waiting area and treatment room. It is highly recommendable that consultation room includes comfortable seating for clients and veterinarians. It is important that designers should not disregard to fit out this room (Garcia, 1993). On the other hand, consultation room may also be used as a resource room which provides the facility with an area for school groups or client-focus group meetings, mini-seminars and even client study. If consultation room is designed to be used for a resource room, this room is acceptable to include glass walls which are facing into the treatment area or even surgery. According to Hafen, R. (1999) by changing the glass wall between the resource room and the treatment room into a folding wall, the resource room can be combined with the treatment area for larger gatherings or meetings.

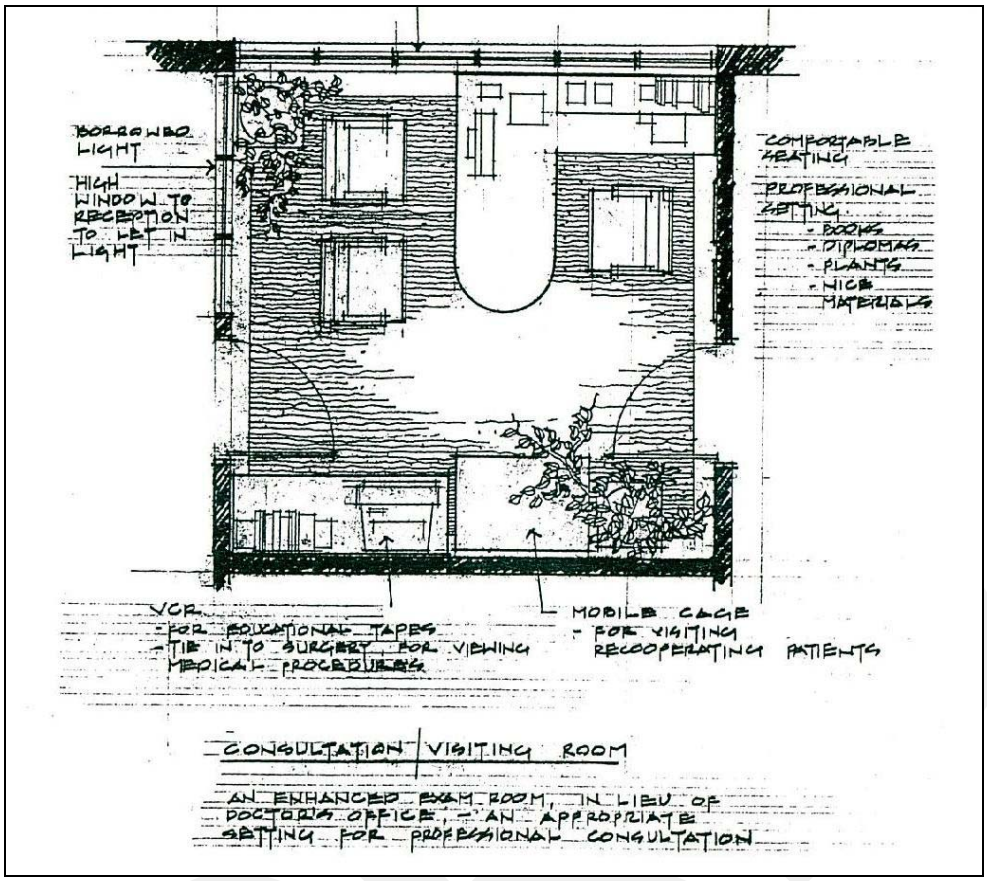

Figure 7. Consultation Room

(Hafen, R. Mark. 1999. Design Innovations, *Designing the Future*, Veterinary Medicine Pub., Kansas, p. 96)

4.2 The Working Zone

The working zone is considered as the heart of the hospital and integrates the pharmacy, treatment area (work room), surgery (operating room), laboratory, and radiology (X-ray room). Grouping these areas lets personnel communicate easily and provides an efficient transition from the greeting zone. In fact, for maximum efficiency, working zone must be in the center of all other areas. This arrangement provides personnel in the treatment area to monitor surgery and still respond quickly when veterinarians need assistance in exam rooms (Knapp, 2000). To fit the pieces of the working zone together, designers need to think

about how big each room needs to be, where to store critical supplies, and how team members will move among the various working areas (Hafen, R. 1999). R. Hafen (1999) advises designers to consider two goals in creating the medical procedure areas;

1. To create an environment that streamlines the way work is performed
2. To enable this work environment to flex with changing veterinary technology and medical procedures (Hafen, R. 1999, 207).

It must be kept in mind that working zone is a special area where designers need to use the space as effective as possible. While designing the working zone, the main areas which form the working zone needs to be analyzed. The most significant points with regard to main areas of the working zone take place in this section.

4.2.1 Pharmacy

In a pet hospital, a pharmacy which must supply a range of pharmaceuticals consistent with a good standard of practice needs to be designed in a separate area (Cited on the website of VSBSA, 2003). Furthermore the pharmacy is logical to be located near exam rooms. Consequently hospital members can access stored supplies easily. Knapp (2000) recommends that at least eight feet wide pharmacy area may keep circulation moving efficiently.

4.2.2 Treatment (Work Room)

Chris Godfrey describes treatment room as the centre of the practice. According to Godfrey (1993), procedural medicine and surgery are the lifeblood of veterinary work. Pet hospitals contain one or more treatment areas which are mostly used for preparing animals for major surgery, performing minor surgery, performing dentistry, and providing medical treatment. The treatment area needs to be separated from the operating room and the reception area, but it might be

part of the examination room (Cited on the website of CVO, 2004). In addition, space in the work room should be designed adequately to occupy present and future needs of the facility.

According to Hamilton (1993b), treatment rooms should be spacious. Natural light needs to be allowed in as much possible and these areas are required to be designed ergonomically as well. In addition, designers should provide sufficient circulation space for efficient working (Cited in Garcia, 1993). Godfrey (1993) confirms the same point of view. He states that ergonomics and natural light are important aspects to consider when designing treatment room. Figure 8 presents an example of treatment area including two freestanding workstations, rolling cages, a cart park and cabinets which clip on the wall.

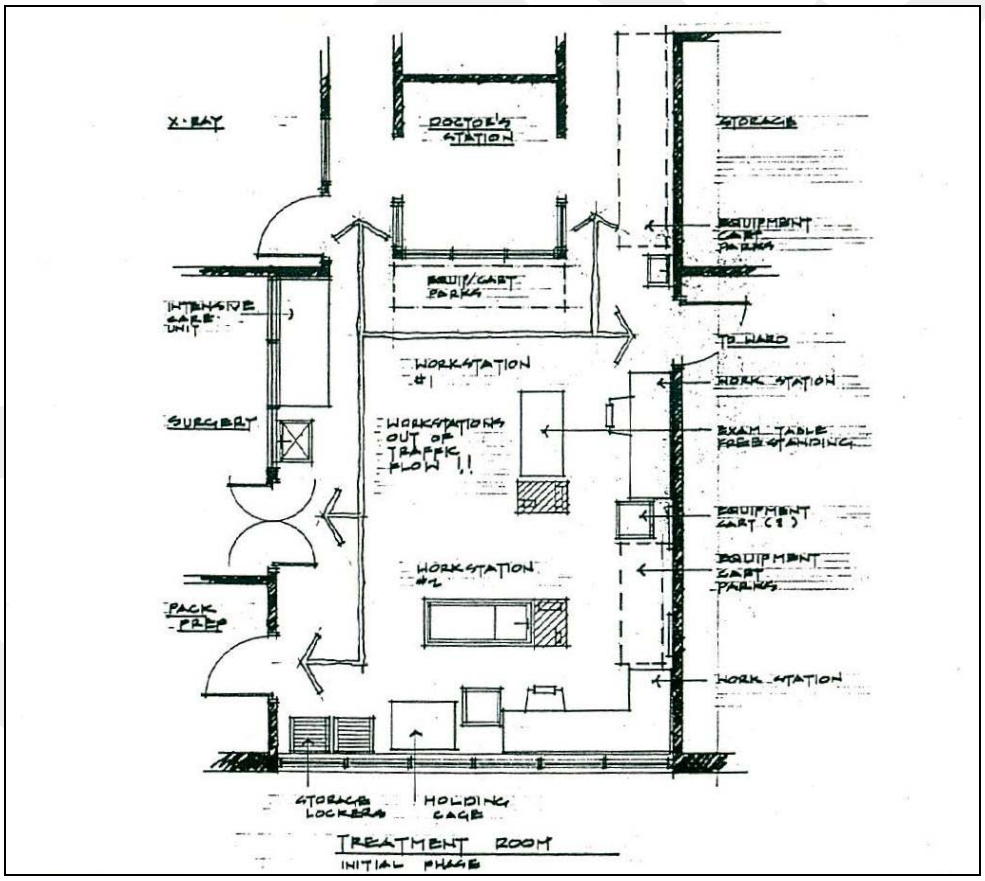

Figure 8. An Example of Treatment Area

(Hafen, R. Mark. 1999. The Super Clinic, *Designing the Future*, Veterinary Medicine Pub., Kansas, p. 87)

It is highly advisable to design cart parks in the treatment room (Figure 8). According to R. Hafen (1999), all equipments including emergency carts should be set aside a wall area in treatment room. This consideration eliminates the common design mistakes in locating the island work station in the center of the room. In addition, the circulation is not interrupted and there will be no need of any other place to set down supplies or equipment which is in use. On the other hand, in small treatment rooms, the work island may be located in the corner of the room with side layout space immediately available and surrounding the actual work table (Figure 9).

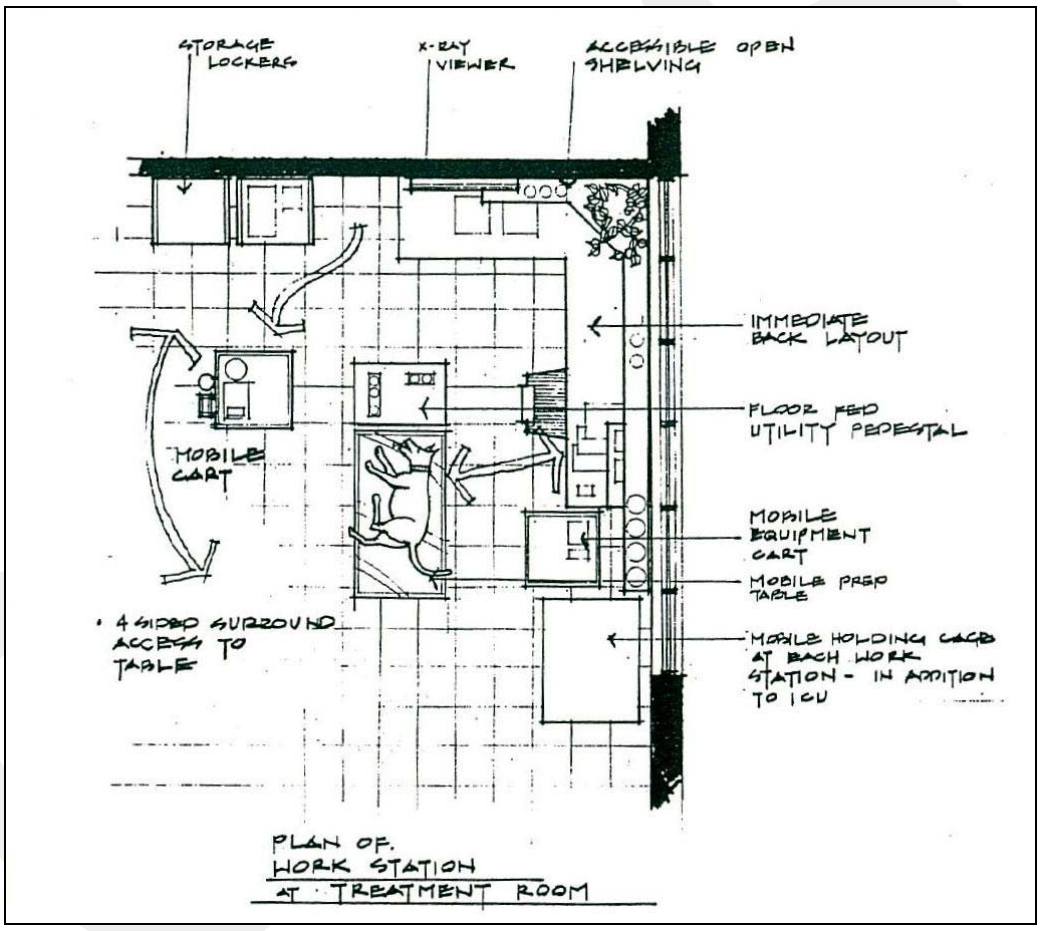

Figure 9. Work Station Located In the Corner of the Room

(Hafen, R. Mark. 1999. Designing Innovations, *Designing the Future*, Veterinary Medicine, Pub., Kansas, p. 101)

Moreover instead of constructing built-in treatment island or peninsula, R. Hafen (1999) suggests that designers move toward a high-density, flexible approach to treatment. The center of this high-efficiency room can be a high-density storage and equipment core. This core is similar to the conventional service column however it is significantly expanded. This core includes a sink, a small countertop, an under-counter refrigerator, mini-shelving for medications, bins for bulk storage, wall mounted racks for tracks, and drawers for equipment and supplies. Around this core designers may arrange free-standing and rolling exam tables varying with the need and the size of the room. An example of a high-flex treatment core in a pet hospital is illustrated in Figure 10. The core combines six work stations into a compact but very workable treatment center.

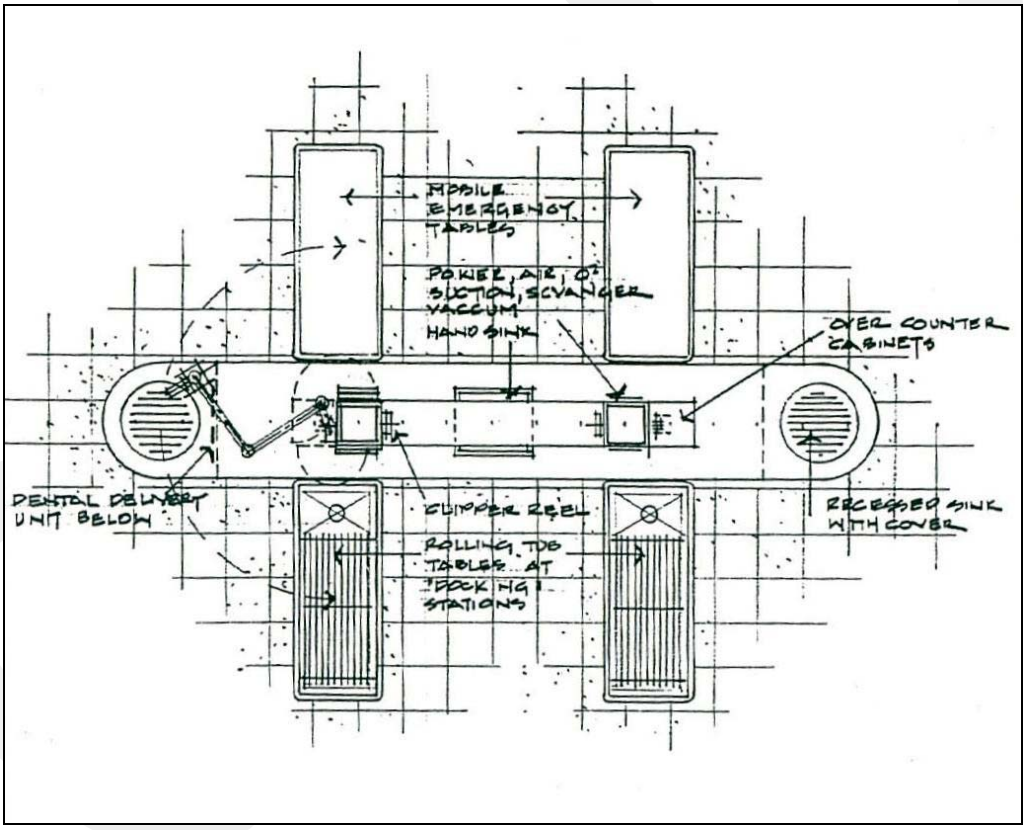

Figure 10. A High-Flex Treatment Core in a Pet Hospital

(Hafen, R. Mark. 1999. A Menu of Design Solutions, *Designing the Future*, Veterinary Medicine Pub., Kansas, p. 210)

The core provides personnel with a central place to find whatever it is needed in the treatment area. Plus the core offers an opportunity to use more or fewer rolling exam tables depending on the capacity of the practice. "Because the exam tables are not built in, the number of tables is possible to be increased or decreased by personnel depending on the workload" (Hafen, R. 1999, 208). As a similar approach to Hafen's, Knapp (2000) supports the idea of island consoles. According to Knapp (2000), they provide the work room with great space efficiency. Island consoles incorporate wet and dry tables providing a column for mechanical elements such as electric outlets, dental equipments etc. and sufficient storage room. Five feet of work area on all sides of the island console provides personnel with efficient work environment. Stations may be combined with L-shaped and even H- or T-shaped units to maximize the effectiveness of the treatment space. In addition, the working zone may include a patient center in the treatment area. It is highly recommendable that the efficiency of the working zone is improved by designing a patient center in the work room.

Patient Center: A patient center is the facility's control, monitoring, and scheduling center. The surgery rooms, treatment stations and intensive-care cages are scheduled in patient center. Hospital members perform patient scheduling, status, charting, and billing in this area. A patient center may consist of glassed-in walls, a charting station, a data entry and computer interface as well as environmental and security monitoring. The glass walls that surround the patient center let the doctors see into the adjacent treatment and work areas of the companion animal facility (Figure 11 and 12).

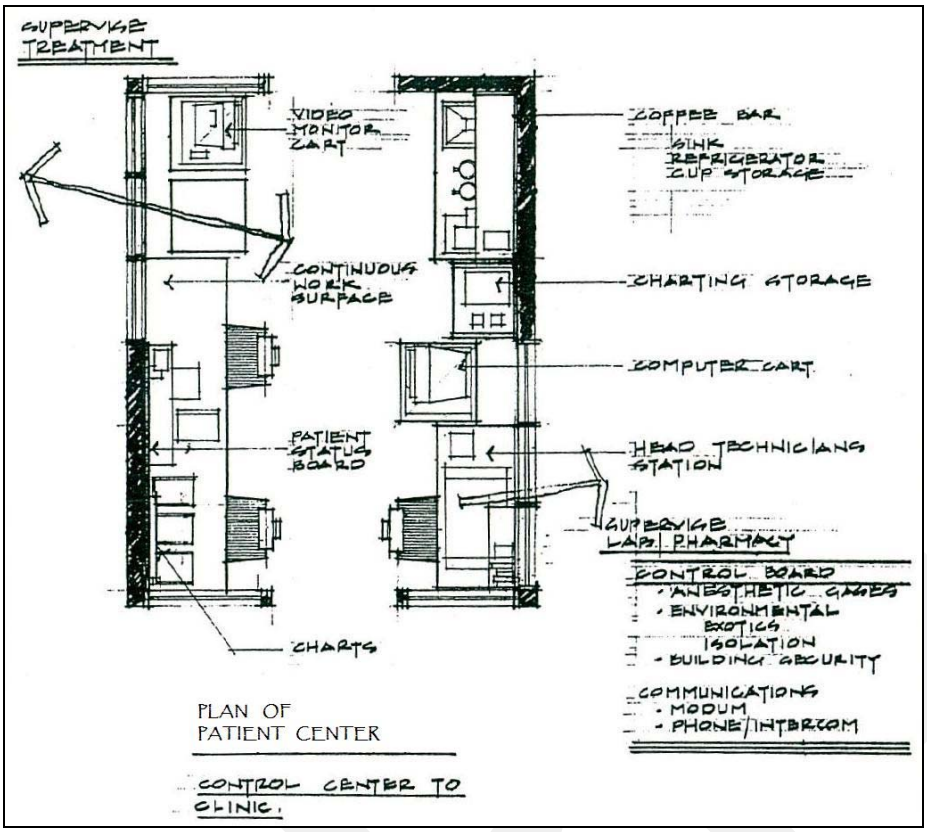

Figure 11. An Example of a Patient Center

(Hafen, R. Mark. 1999. The Super Clinic, *Designing the Future*, Veterinary Medicine Pub., Kansas, p. 89)

The patient center may be a room or an alcove. In large facilities, this area might be a separate, glass-enclosed room staffed by a full-time patient scheduling and/or data entry clerk. On the other hand, for a small facility, patient center might be designed as a corner of the treatment which contains dry-erase board, computer, and phone (Hafen, R. 1999). For most pet hospitals, patient center is formed with only a small counter with a dry-erase board, charting racks and a computer outlet. Figure 12 shows a patient center which is formed in this consideration and a glass-enclosed ICU ward.

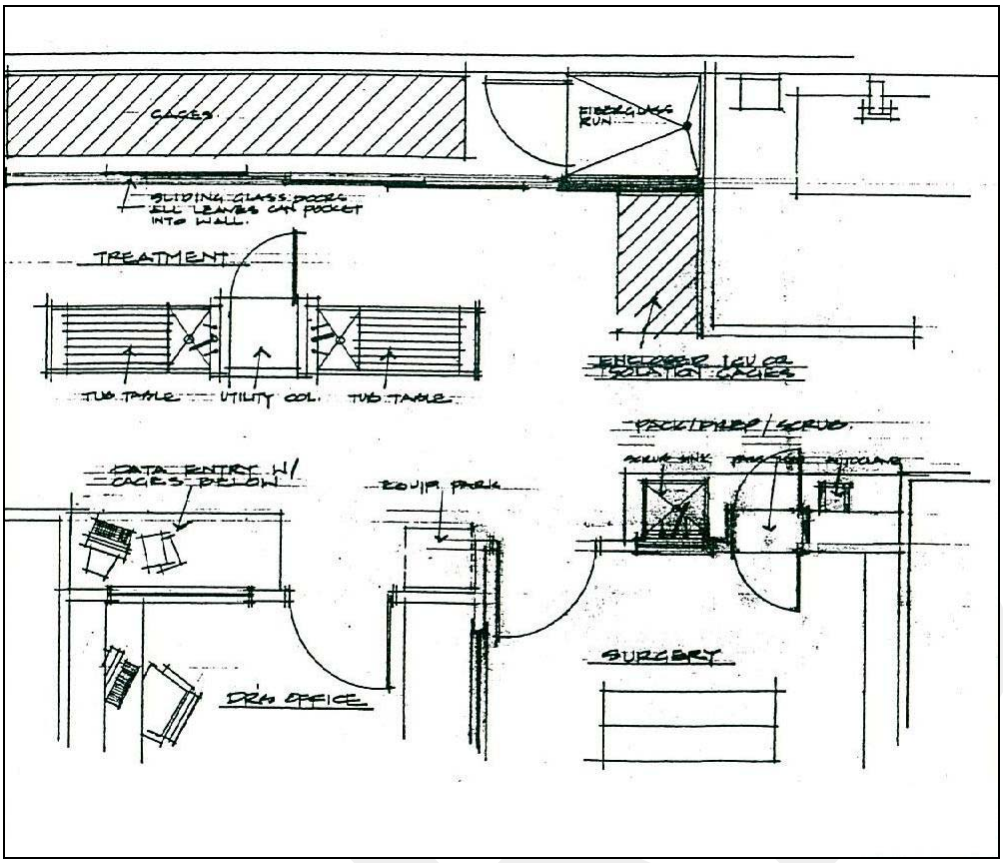

Figure 12. A Patient Center and a Glass-Enclosed ICU (Intensive Care Unit) Ward

(Hafen, R. Mark. 1999. A Menu of Design Solutions, *Designing the Future*, Veterinary Medicine Pub., Kansas, p. 203)

4.2.3 Surgery (Operating Room)

An operating room must be designed separate from other areas and used exclusively for surgical operations. This room is advised to be near treatment/preparation area. Therefore sterilization of surgical materials, induction of gaseous anesthesia, pre-operative preparation of the patient, scrubbing of surgeon's hands and post-operative recovery take place effectively in the working zone. The operating room must be designed to contain moveable surgical furniture and equipment including surgical light, operating table (Cited on the

website of VSBSA, 2003). Moreover the room's solid walls, floor and doors are necessary to be made of fluid-impervious materials which is easily sanitized (Cited on the website of CVO, 2004). In addition, Godfrey (1993) suggests designers to create easy-to-clean surfaces, minimum corners and adequate room to move in the operating room which he describes as the cleanliness centre. Hamilton also put forward the same standards for surgery rooms as Godfrey mentions. According to Hamilton (1993b), it is necessary to maintain easily cleanable surfaces, minimum ledges for dust control in the surgery rooms. Moreover all equipment should be mobile for ease of cleaning (Cited in Garcia, 1993).

From the view point of Knapp (2000), designers need to start their plans in the center to determine the ideal size for surgery suite. Three feet of space on all sides of the surgery table is needed for the doctor and any assistants plus two additional feet to accommodate mobile equipment. On the other hand, five to six feet of space is required between the tables for a dual suite. This indicates that the ideal size for a single surgery needs to be about 15-by-12 feet; for a double surgery it needs to be 15-by-18 feet

R. Hafen assesses surgery rooms from a different point of view. R. Hafen (1999) points out that making clients wait probably send a message to clients that their time is not as valuable as doctors. Therefore designers need to create an environment which sends a message to clients that waiting can be fun. Considering this, operating rooms may likely be transformed into active, engaging education and entertainment centers. The design features of the infotainment center include surgery or special procedures theatre which consists of interactive displays in combination with the laboratory equipments. Surgical suit is the most suitable area to be a true theatre where people can see what veterinarians do (Figure 13).

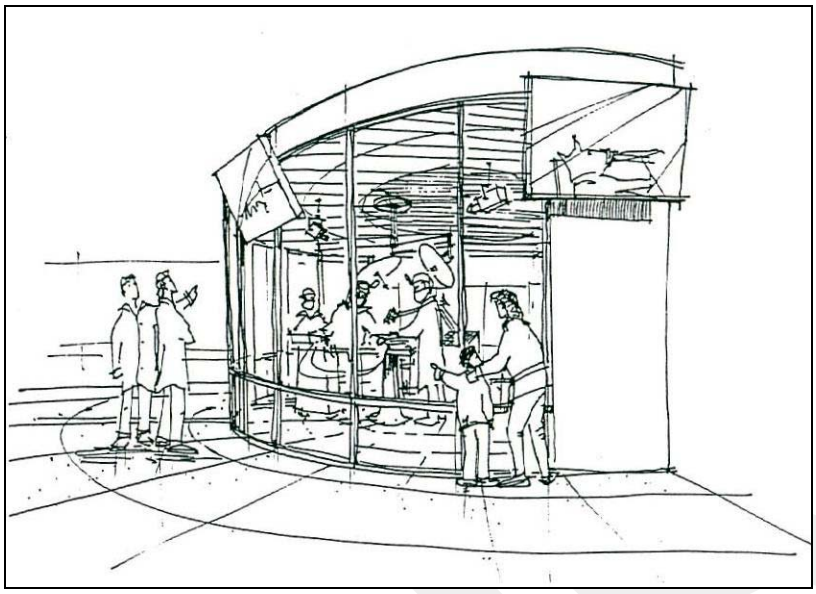

Figure 13. An Example of Medical Infotainment
(Hafen, R. Mark. 1999. A Menu of Design Solutions, *Designing the Future*, Veterinary Medicine Pub., Kansas, p. 189)

4.2.4 Laboratory

A diagnostic laboratory services must be available in a pet hospital. Laboratory services should include necropsy, hematology, histopathology, microbiology, clinical pathology, serology, and parasitology as well as other routine or specialized laboratory procedures, as needed. Laboratories need to have similar standards to surgery rooms. Designers are required to create easy-to-clean surfaces in this area. Moreover these surfaces are necessary to be made of germ-free and fluid-impervious materials. It must be kept in mind that odor is the major problem which designers need to concern when designing a diagnostic laboratory service (Hafen, R. 1999).

R. Hafen considers diagnostic laboratory services as another infotainment center. According to R. Hafen (1999), future in veterinary practice lies in reaching out and sharing knowledge with clients. Companion animal facility has a great potential to become a resource center for clients. Laboratory is a living science

exhibit which provides an opportunity to teach kids and clients about health and the environment. Laboratory can also be used to teach health issues and at the same time entertain clients. Regarding this, the rear walls of the exam room may become full-height glass and that the exams look out on a lab demonstration area. While waiting for the doctor, the clients have a chance to see the technicians spinning down blood, preparing slides and blood chemistry panels. Figure 14 shows that the rear walls of the exam rooms look out on a laboratory demonstration area.

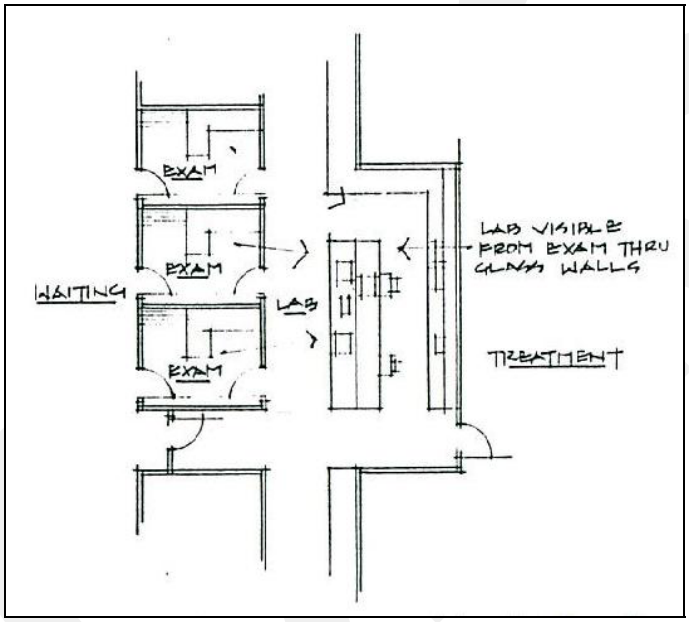

Figure 14. Laboratory Demonstration Area

(Hafen, R. Mark. 1999. A Menu of Design Solutions, *Designing the Future*, Veterinary Medicine Pub., Kansas, p. 190)

4.2.5 Radiology (X-ray Room)

X-ray room should to be designed to have equipments which are capable of producing diagnostic radiographs of all areas of all sizes of dogs. A separate darkroom with bench and storage facilities is required to be a part of the radiology section (Cited on the website of VSBSA, 2003). Knapp (2000) suggests positioning the radiograph table in the center of the room with three to four feet

of open space on either side. It is highly recommendable to design the radiography room with a 4-by-9-foot dark room on one side and a 6-by-9-foot viewing room on the other. Therefore the viewing room is used to store films as well.

R. Hafen (1999) mentions that in the future, companion animal facilities will have increased emphasizes on diagnostics. In addition to the present-day X-ray unit, increased use of small-scale MRIs, called E-MRIs, as well as high-resolution ultrasound and CT scans will take place in companion animal facilities. Although these equipments are not economically viable right now, designers are required to expand existing X-ray space to include other forms of diagnostics imaging.

4.3 The Dwelling Zone

With regard to patient design concepts, firstly, patient housing needs to be designed to make day-to-day maintenance and cleaning easy. After that, designers need to create an environment which actively enhances health and healing. Finally the next step is to be to provide a clean, comfortable environment for clients (Hafen, R. 1999).

The ideal patient environments provide patients with natural light and fresh air. Moreover they create opportunities for exercise and an environment which reduces stress. "The goal of designers in designing spaces for patient housing should be to focus not only on how the facility is required to be cleaned and maintained but on the animal's comfort and health" (Hafen, R. 1999, 212). Patient design concepts are developed considering the design of the wards. Major points to be considered in design of wards take place in this section.

4.3.1 Wards for Different Levels of Care

Designers used to group wards according to animal size or species. For example, they build cat wards, small dog wards, and large dog runs. Consequently

hospitals bill the clients according to the size of the cage which the animal occupied rather than the type or level of care that the animal received (Hafen, R. 1999). R. Hafen (1999) points out that billing this way, sends an inappropriate message to the client: The larger the animal, the more valuable it is. In veterinary practice, patients can receive several levels and types of care based on their specific needs. It is necessary to make some basic distinctions about animal housing, the monitoring that the team provides and the level of care which the animals require. Thus, it is important to differentiate between general animal holding, recovery, acute and intensive care wards. Each of these wards is required to be designed, located, and then equipped and configured according to the level of care which the team provides. Patient housing regarding levels and types of care based on animals' specific needs may likely be developed as below:

1. The Level One area is designed to be the recovery.
2. The Level Two area is designed to be intensive care unit (ICU); acute care, post-operation, or isolation.
3. The Level Three area is designed to be rehabilitative care.
4. The Level Four area is designed to be boarding without specific medical care required.

The distinctions in the wards must be based not only on what is easy and convenient for the doctors but also on what is good for the patient. Pet hospitals need to group patients by level of care required. It is not convenient to group patients by their size and species. R. Hafen (1999) advises designing a glass-fronted, quiet, isolated place which is equipped with multi-level night lighting in the dwelling zone. This design approach is a practical way to keep the animals visible and give them a quieter, calmer place. The wards for different levels of care in the dwelling zone are illustrated in Figure 15.

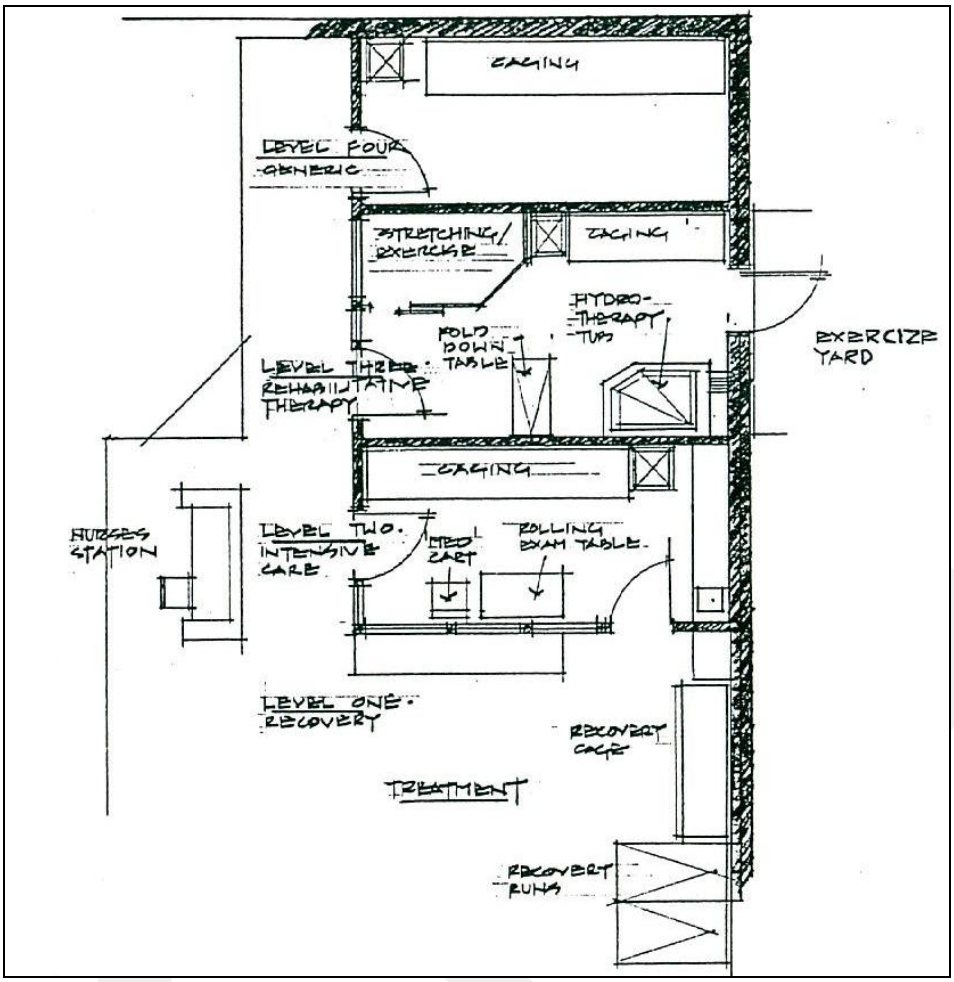

Figure 15. Wards for Different Levels of Care in the Dwelling Zone

(Hafen, R. Mark. 1999. A Menu of Design Solutions, *Designing the Future*, Veterinary Medicine Pub., Kansas, p. 213)

The Level Two area for ICU (Figure 15) is designed with a small nurses' station/exam counter in order that animals in wards can be examined and medicated without having to return to the treatment room. The Level Two area may need to contain separate heating, cooling, and air filtration systems (Hafen, R. 1999, 215). Designers often locate ICU cages in the treatment area considering that the doctors keep an eye on the patient easily. But what designers ignore is the stress of being in a high-circulation area under intense lights. In regards to human health care, Wayne Ruga (1999) points out when a patient's anxiety increases, the immune system is suppressed, and the body is weakened in its

ability to fight disease. If anxiety is reduced in human patients, it is a positive step toward their recovery. As a result, this also makes sense to reduce stress in animal patients and therefore to speed their recovery.

Isolation ward is a critical area of the dwelling zone and this area needs to be controlled frequently. Ideally, employees pass the isolation room regularly and check pets through a window (Hafen, R. 1999). Alternatively, Knapp (2000) considers that isolation wards are required to be placed far from other patient housing areas. Knapp (2000) points out that place of isolation should be close to a rear, outside door, since visiting pets or boarders are not desired to be exposed to sick animals.

Physical rehabilitation and physical therapy is an area which is mostly ignored by most practices. Animals, like people, need rehabilitation after major surgery or a long-term disability. Therefore designers need to plan such areas that companion animal facilities can provide patients with ultrasonic therapy, hydrotherapy, therapeutic massage and physical therapy in a therapy room. A Level Three area for rehabilitation (Figure 15) which consists of oversize cages is useful to be connected to the runs facing an outdoor exercise yard. Moreover The Level Three area can also be designed particularly for working clients who can not take time off to care their pets when they recover from major surgery (Hafen, R. 1999).
There are also other specialty care areas that designers would consider. Exercise areas and day rooms for intensive-care patients are two of the specialty care areas in the dwelling zone of a pet hospital.

Day-Rooms for Intensive-Care Patients: A day-room for intensive-care patients is another variation on the specialty care. This place may likely be designed as a small, glass-enclosed room which is visible from the patient center (Figure 16). The day room is used by clients or personnel to visit critical care patients that need to stay in the hospital for extensive period of the time. The day-room is necessary to be quiet, stress-free corner of the facility. The room includes a small

bank of cages, a fold-away treatment table, and a window alcove with a seating unit. The seating unit allows clients to sit and visit their animals.

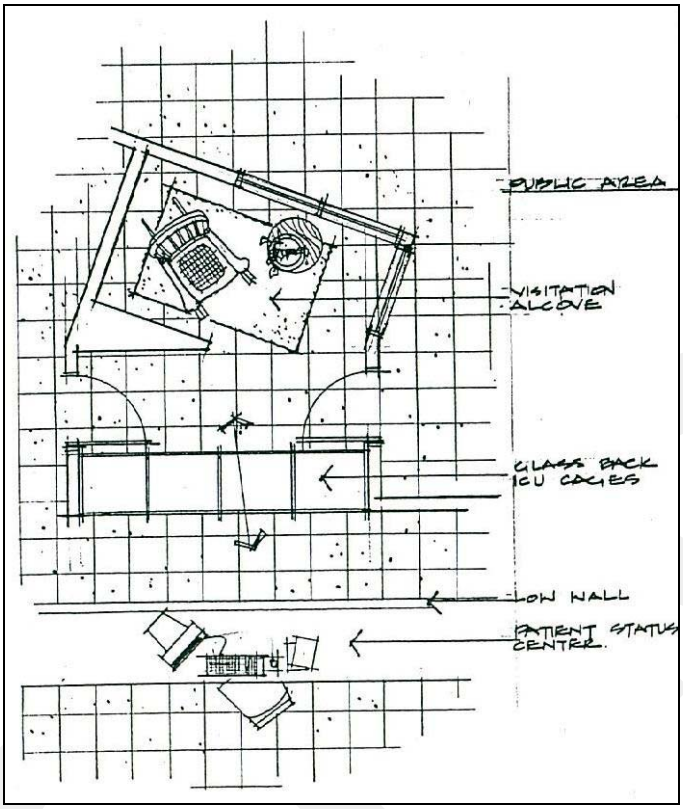

Figure 16. ICU Day-Room for Intensive-Care Patients

(Hafen, R. Mark. 1999. A Menu of Design Solutions, *Designing the Future*, Veterinary Medicine Pub., Kansas, p. 216)

Exercises Areas: A small, glass-enclosed area within the dwelling zone provides boarded animals with an adequate place to exercise. A 6-by-6 feet compartment which includes a carpeted climbing tree and platforms is an ideal exercise area for cats. On the other hand, "a 1.8-by-6.1 meters greenhouse section which is attached to the side of the boarding portion of a facility is also an ideal exercise area for dogs" (Hafen, R. 1999, 106).

4.3.2 Designing Better Boarding

In a pet hospital, what a client does not want to see is his or her precious pet is locked up in a jail. But this is exactly what a typical cage looks like. Most cages in companion animal facilities are cold and dark boxes with bars. In view of that, R. Hafen (1999) suggests designers to make motivating boarding areas. He point outs that the townhouse model can be applied to overcome this problem. "Cat townhouses" which look like a cross between cat condos and overgrown doll houses provide each cat to get its own townhouse where he or she can sit in a little bay window looking out at the world. These little townhouses are recommendable to face the waiting area. Thus, when clients come to pick up their pets, they find them sitting contentedly in the townhouses. On the other hand, the same model can be provided for dogs by creating two-story, double-deck dog runs. The back side of each run is designed as a large window which faces the outside while the inside door is designed as a storefront glass door. These design features make the boarding area an exciting and motivating place. Moreover designing dollhouse-like habitats for the animals helps break down clients' reluctance to board pets.

Condominium is another boarding type which provides animals with better conditions in dwelling zone (Figure 17). This kind of boarding system links several cages or runs together with doors or hatches. Condominiums are considered as useful for pet boarding especially when clients want to provide their pets with more room during their stay at the facility. Consequently clients have chance to rent combined units for their pets.

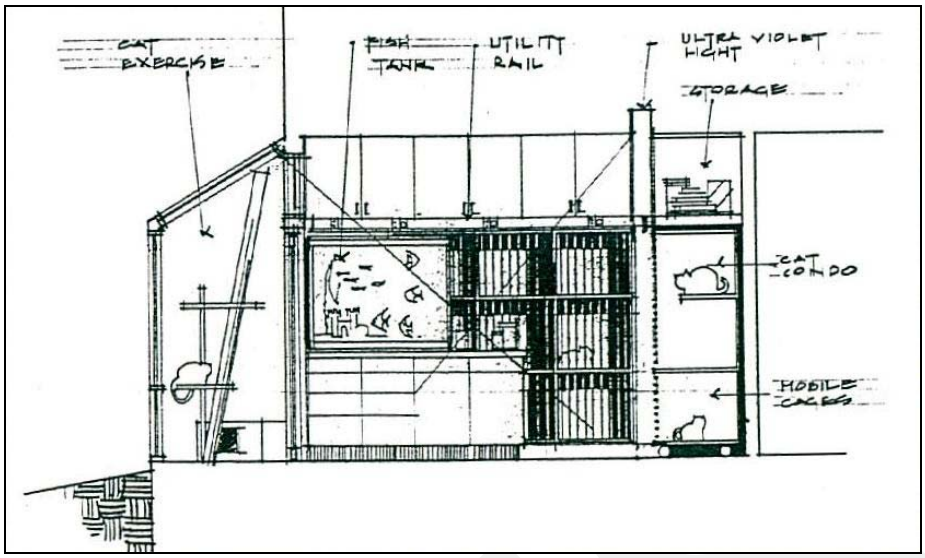

Figure 17. Condominium Model for Housing Pets

(Hafen, R. Mark. 1999. More Design Innovations, *Designing the Future*, Veterinary Medicine Pub., Kansas, p. 106)

Designers are expected to create natural environments in the dwelling zone to provide patients with better boarding. Studies prove that sunlight is beneficial to animals however most of the wards let in minimal sun light. Skylight is one of the most cost-effective ways to obtain required sunlight. Moreover it is one of the safest ways to let light into patient area. Skylights eliminate animals to escape out as they may escape from a standard window. According to R. Hafen (1999) hanging plants may also be added below the skylight to obtain a natural environment. Figure 18 presents a number of ideas for making a more pleasant animal environment: vaulted ceilings and skylights banners, ceiling fans, plants and a radiant concrete floor.

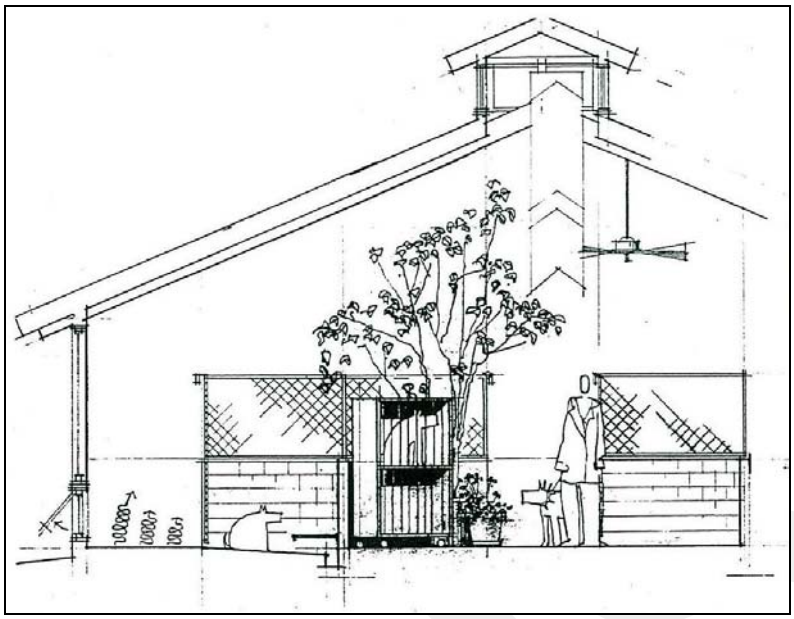

Figure 18. An Example of a Pleasant Animal Environment

(Hafen, R. Mark. 1999. More Design Innovations, *Designing the Future,* Veterinary Medicine Pub., Kansas, p. 105)

Veterinarians often have preferences for colors and materials specific to his or her facility, sometimes based on the geographic location. However the proper color preferences include white, off-whites, and pale tones for the wall and floor areas. Colors associated with nature, such as forest green, brown and rust are highly recommendable to be used within companion animal facilities. Treatment areas such as surgery and the acute care areas are generally treated with off-white colors for the walls. Animal housing areas are generally kept in a light tone. Studies regarding cats and dogs and their response to color are still in progress. However there has been some interesting data in regards to pet response to color (Piotrowsky and Rogers, 1999, 220). The interior designer must consider the interior environment's effect on the pet owner as well as on the pet itself. It is supposed that a pet reacts to the mood of its owner which can therefore affect the pet's reaction to the visit. Finally, boarding areas in companion animal facilities should be more than just a stainless-steel cage for pets. Pet hospitals should be a part of the nature and the environment exhibit which is aimed at teaching earth-conscious clients about the environment while they are waiting with pets.

CHAPTER 5

A COMPARATIVE ANALYSIS ON EXAM ROOMS IN ANKARA

Pet hospitals have an important role in treating animals since they have been found as a fundamental necessity for all pet owners' experiences. Pet hospitals are the key stone facilities to cure most animals. The efficiency of these facilities reflects the vision of health care conditions in the developing countries. With regard to the role of companion animal facilities in health care industry, interior design of these facilities must be developed intimately as much as the health care facilities for humans.

5.1 Purpose of the Study

As mentioned before, an exam room is an area where animals are examined; medical treatment, vaccination, i.v. solutions and other biological fluids are given. Besides other sections of veterinary facilities, exam room has a particular function. Clients directly experience the medical care which is provided for their pets only in this area. When pet owners walk in the exam room, they initially watch and assess the behavior and attitude of veterinary and other incumbents to get some ideas about their reliability and proficiency. Moreover the exam room's well functioning helps the facility to give positive impression to the clients. Therefore interior design of exam rooms becomes an important factor in planning of veterinary facilities. Accordingly this study is aimed to describe an ideal exam

room for veterinary practitioners who plan to set up a companion animal facility in Turkey**.** Ideal exam room is defined through an analysis of exam rooms with multi-function and exam rooms with specific function in sample facilities. When designing exam rooms, designers must be aware of the design requirements and considerations which have been stated in the previous chapters.

5.2 Description of Sample Clinics

There are four sample pet hospitals which represent two alternate considerations. These samples are selected from different parts of Ankara. Ankara Veterinary Medical Center and Beysukent Veterinary Clinic are well known two modern facilities in Ankara. They include examination rooms for specific function whereas Çayyolu Veterinary Clinic and Ankyra Animal Hospital which are another two well known facilities have examination rooms for multi-function operations. Ankara Veterinary Medical Center includes three exam rooms with specific function. In addition, Beysukent Veterinary Clinic contains two exam rooms with specific function. On the other hand, Çayyolu Veterinary Clinic consists of two multi-function exam rooms. The first exam room is used for X-ray and animal holding while the second room is used for surgery and sterilization besides the rooms' specific function. Ankyra Animal Hospital contains two exam rooms. The first room is used only for exam room function. The second room is used for emergency room besides its specific function. The information about these veterinary facilities including facility plans take place in this section.

Ankara Veterinary Medical Center:

Table 9 presents general information about Ankara Veterinary Medical Center. Figure 19, 20, 21 illustrate the facility plans.

Table 9. General Information about Ankara Veterinary Medical Center

ANKARA VETERINARY MEDICAL CENTER			
Floors	Basement Floor Ground Floor First Floor		
Number of Exam Rooms	3 Exam Rooms at Ground Floor		
Size of the Facility (m^2)	800 m^2		
Sections of the Facility According to Floors	Basement Floor * Pension * Secretary	Ground Floor * Reception * Waiting Room * Retail (Pet shop) * Examination Rooms * X-Ray Room * Grooming * Pharmacy (Behind Reception) * Laboratory * WC	First Floor * Changing Room * Storage * Doctor's Office (includes storage and on duty room) * WC and Laundry * Dark Room * Treatment (includes intensive care and patient room) * Operation Room (includes preparation rooms for doctor and patient, and sterilization) * Kitchen

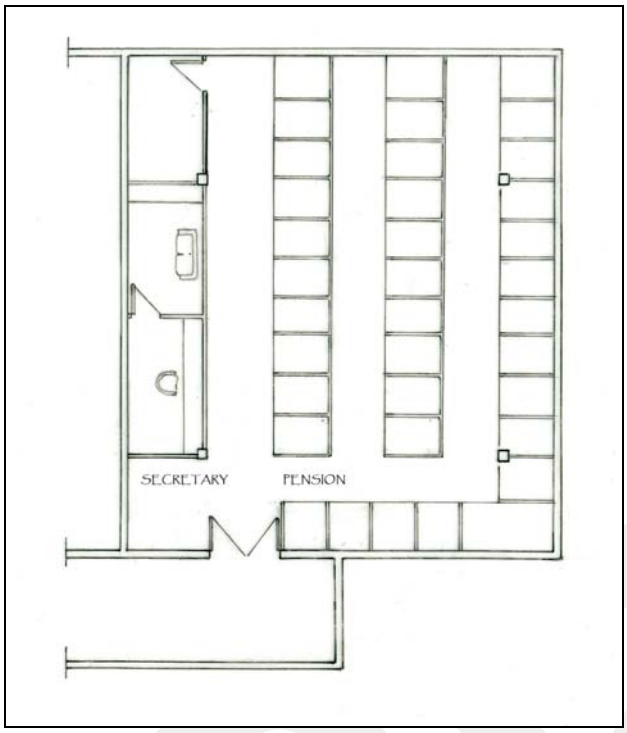

Figure 19. Basement Floor Plan of Ankara Veterinary Medical Center

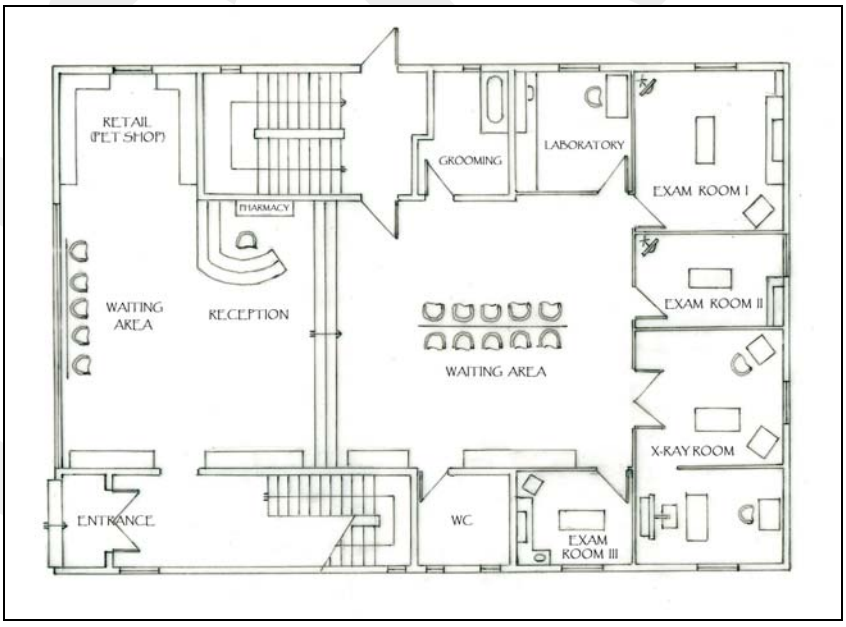

Figure 20. Ground Floor Plan of Ankara Veterinary Medical Center

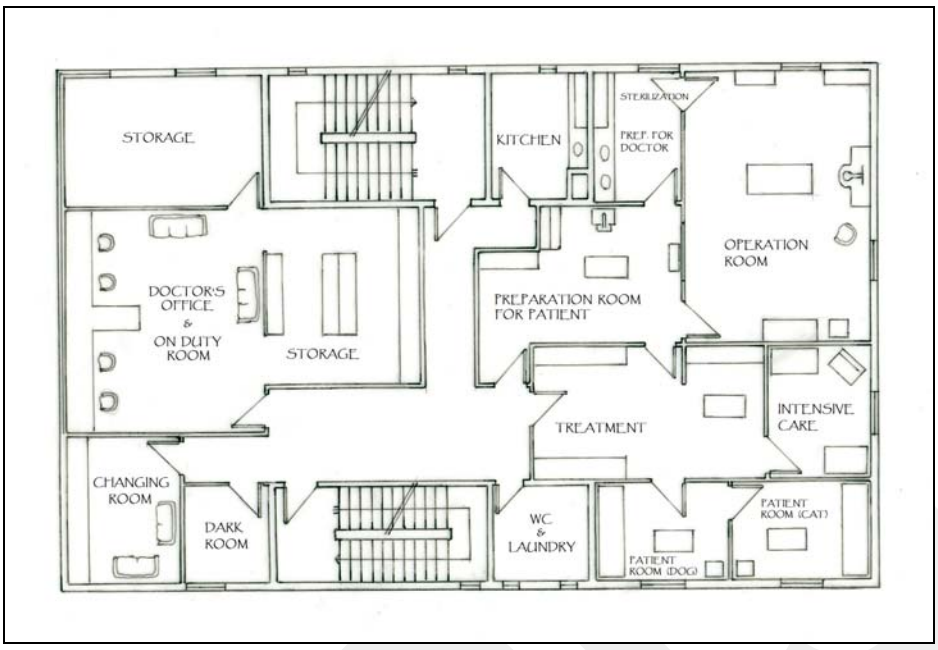

Figure 21. First Floor Plan of Ankara Veterinary Medical Center

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Beysukent Veterinary Clinic:

Table 10 presents general information about Beysukent Veterinary Clinic. Figure 22, 23, 24 illustrate the facility plans.

Table 10. General Information about Beysukent Veterinary Clinic

BEYSUKENT VETERINARY CLINIC			
Floors	Basement Floor Ground Floor First Floor		
Number of Exam Rooms	2 Exam Rooms at Ground Floor and First Floor		
Size of the Facility (m^2)	240 m^2		
Sections of the Facility According to Floors	Basement Floor * Pension * Patient Room (Dog) * Grooming * Storage	Ground Floor * Reception * Waiting Room * Examination Room (includes Pharmacy) * WC	First Floor * Examination Room * Patient Room (Cat) (includes intensive care and X-Ray) * Laboratory * Operation Room * WC for Doctors (includes Dark Room)

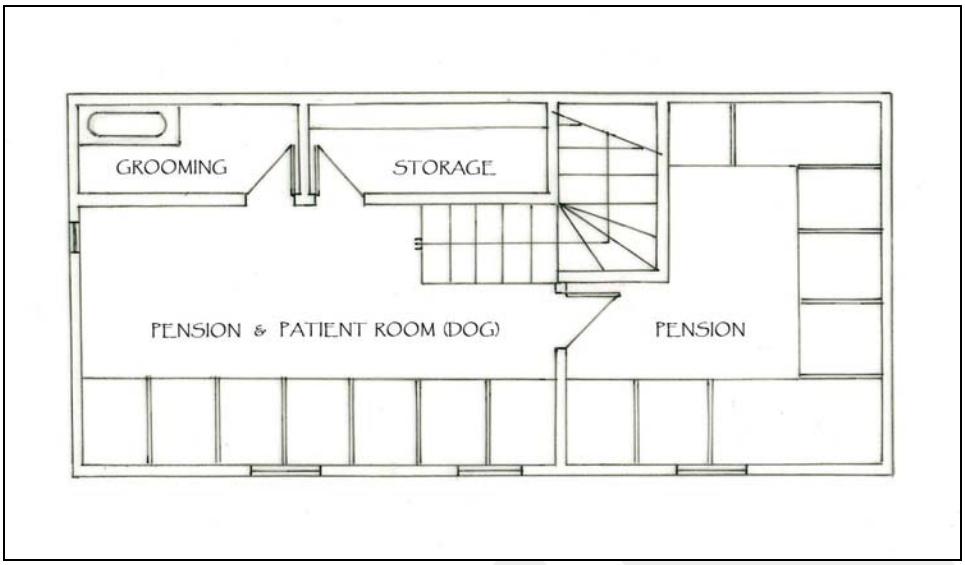

Figure 22. Basement Floor Plan of Beysukent Veterinary Clinic

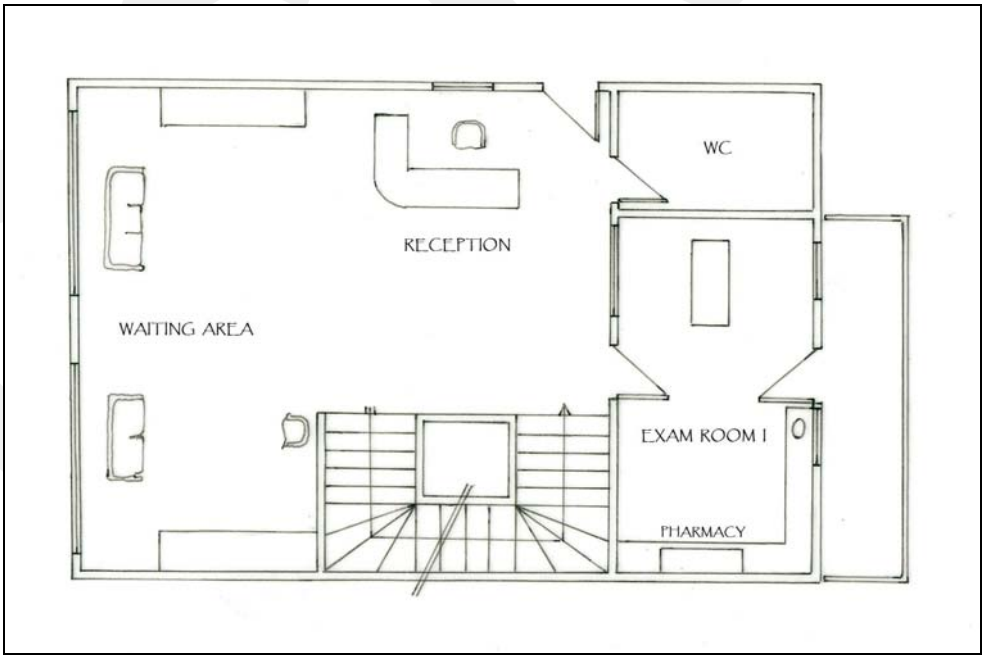

Figure 23. Ground Floor Plan of Beysukent Veterinary Clinic

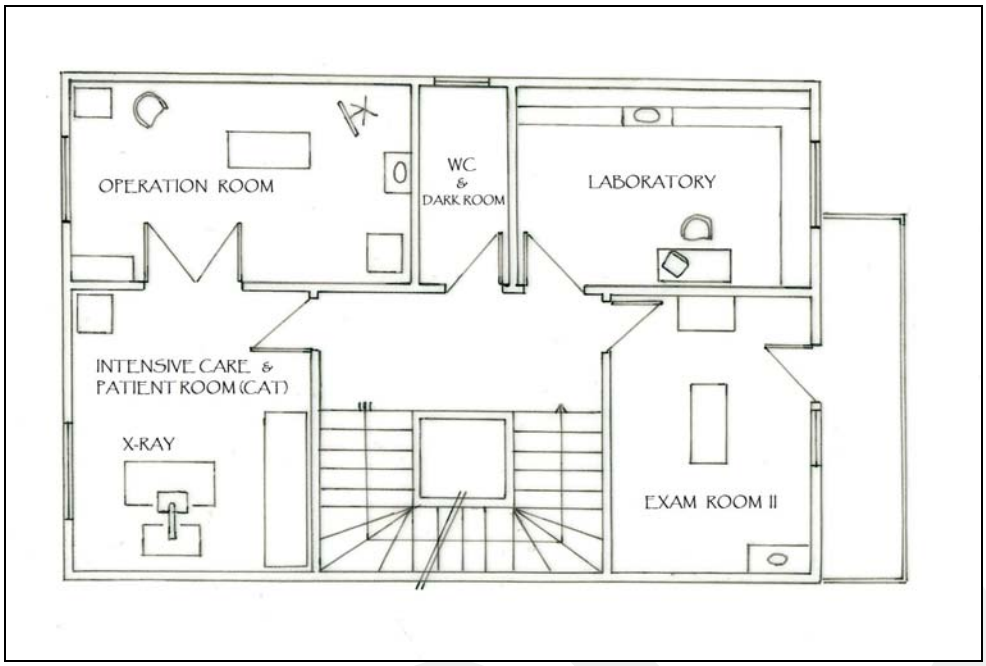

Figure 24. First Floor Plan of Beysukent Veterinary Clinic

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Ankyra Animal Hospital:

Table 11 presents general information about Ankyra Animal Hospital. Figure 25 and 26 illustrate the facility plans.

Table 11. General Information about Ankyra Animal Hospital

ANKYRA ANIMAL HOSPITAL		
Floors	Basement Floor Ground Floor	
Number of Exam Rooms	2 Exam Rooms at Ground Floor	
Size of the Facility (m^2)	150 m^2	
Sections of the Facility According to Floors	Basement Floor * Patient Room * Intensive care * X-Ray Room * Laboratory * Isolation	Ground Floor * Reception * Waiting Room * Doctor's Office * Examination Rooms (one includes emergency care) * Preparation Room for Patients * Operation Room * Pharmacy * WC

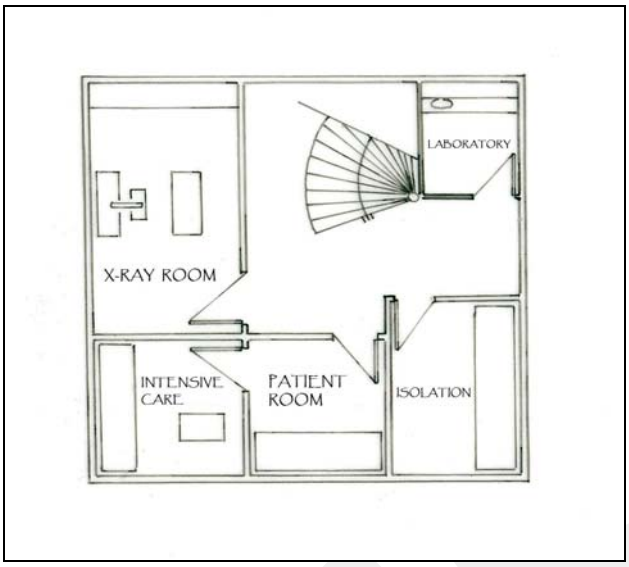

Figure 25. Basement Floor Plan of Ankyra Animal Hospital

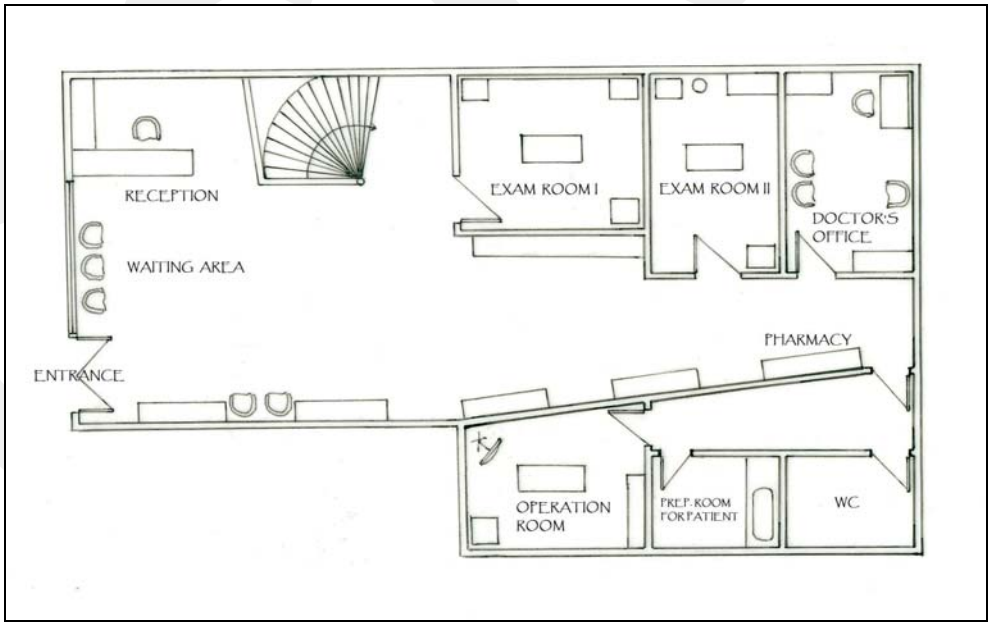

Figure 26. Ground Floor Plan of Ankyra Animal Hospital

Çayyolu Veterinary Clinic:

Table 12 presents general information about Çayyolu Veterinary Clinic. Figure 27 illustrates the facility plan.

Table 12. General Information about Çayyolu Veterinary Clinic

ÇAYYOLU VETERINARY CLINIC	
Floors	Ground Floor
Number of Exam Rooms	2 Exam Rooms at Ground Floor
Size of the Facility (m^2)	110 m^2
Sections of the Facility According to Floors	Ground Floor * Reception * Waiting Room * Examination Rooms (one includes operation and sterilization, other one includes X-Ray, patient room and pharmacy) * Changing Room * WC * Grooming * Kitchen

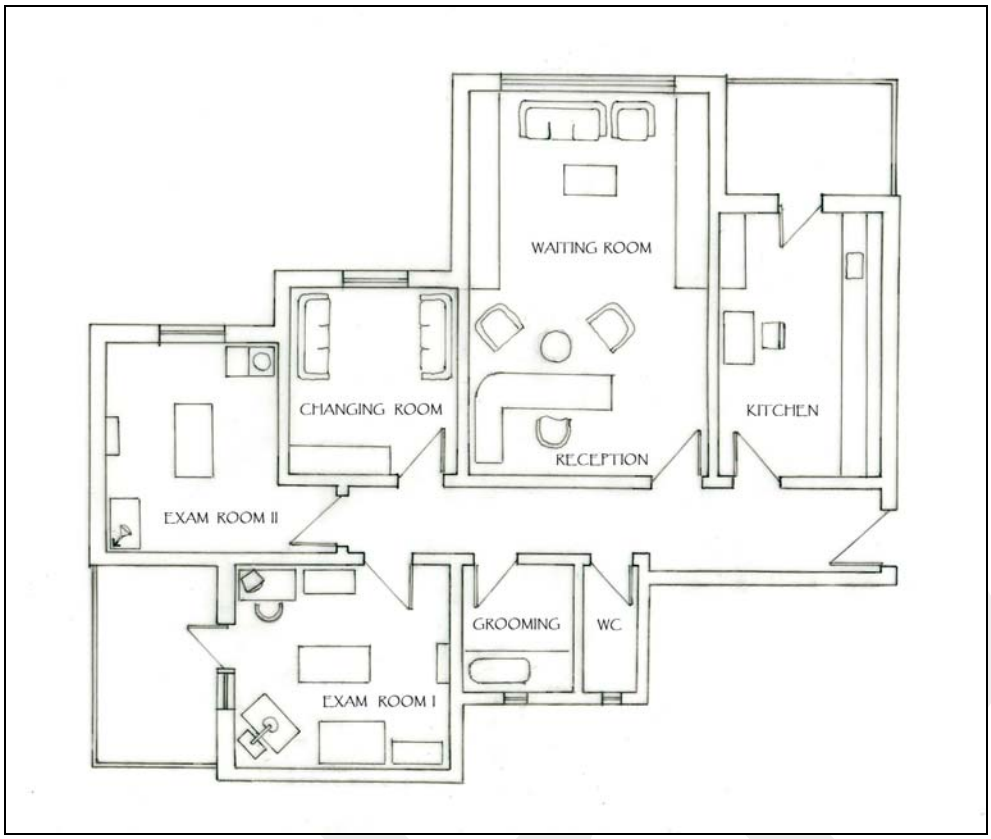

Figure 27. Ground Floor Plan of Çayyolu Veterinary Clinic

5.3 Methodology

Since most veterinary practitioners either buy or rent apartments or buildings, their designs are limited by constructions and dependent on the conditions of the buildings in Turkey. Therefore the veterinary facilities may have to include multi-tasks rooms such as exam rooms which contain other functions like the functions of working zone or dwelling zone. The exam rooms are analyzed in view of two alternate considerations which are exam rooms with multi-function and exam rooms with a specific function. Subsequently the rooms are evaluated with five criteria regarding two alternate considerations. These criteria take place below.

Criteria to analyze exam rooms:

- Materials
- Light
- Noise
- Odor
- Circulation

This study evaluates the criteria by doing surveys and making observations in sample veterinary facilities as well as analyzing the layouts of the interior spaces. The analysis is based on the exam rooms in the sample places. Consequently, exam rooms of these two considerations are expected to have a different effect on the sample veterinary facilities.

These criteria below are the main subjects which veterinary facilities have the most problems with. Designers may vary criteria when analyzing veterinary exam rooms such as orientation, cost, marketing, etc. In this study, measurement of material and light are developed with several surveys. On the other hand, measurement of noise and odor are conducted with observations however odor is also a part of the survey. Circulations in exam rooms of the sample veterinary facilities are measured with analyzing the layout of the interior spaces.

Analysis of Material for Sample Veterinary Facilities:

- Defining types of finishing materials that are used on all surfaces of exam rooms of the sample veterinary facilities.
- Grading materials used in the exam rooms with the Checklist of Suggested Materials for Planning a Pet Hospital.

Analysis of Lighting for Sample Veterinary Facilities:

- Defining types of lighting that are used in the exam rooms of the sample veterinary facilities
- Defining the size of openings in the exam rooms of the sample veterinary facilities

- Grading lightings of the exam rooms with the light standard stated at Guidelines for Laboratory Animals by University of Minnesota
- Grading openings in the exam rooms which represent two alternate considerations

Analysis of Noise for Sample Veterinary Facilities:

- Defining noise level by observing noise in exam rooms
- Grading noise in the exam rooms which represent two alternate considerations

Analysis of Odor for Sample Veterinary Facilities:

- Defining types of ventilation that are used in the exam rooms of the sample veterinary facilities
- Defining odor level by observing odor in exam rooms
- Grading odor in the exam rooms which represent two alternate considerations

Analysis of Circulation for Sample Veterinary Facilities:

- Defining circulation paths in exam rooms by diagrams

5.4 Grading and Analysis Techniques

Grading process is done with evaluating the criteria. Criteria including Material, Light, Noise and Odor are graded according to standards or the points given by subjects. Analysis takes place for circulation. Circulations in exam rooms are defined and evaluated with diagrams.

5.4.1 Grading Materials

Materials used in exam rooms are graded according to surfaces. The surfaces are ceiling, floor and walls. A material on each surface is graded regarding with the Checklist of Suggested Materials for Planning a Pet Hospital developed by Dan

Chapel (2004). 10 points is given to that material if it is convenient with the Checklist. If the material is not valid for the Checklist, it receives 0 point. Similar materials to those in checklist or several materials which are used together on surfaces are evaluated between 0 and 10 points. Table 13 below shows the Checklist of Suggested Materials for Planning an Exam Room of a Pet Hospital which is developed by Dan Chapel.

Table 13. The Checklist of Suggested Materials for Planning an Exam Room in a Pet Hospital

(Chapel, Dec. 2004. Finish Materials for Veterinary Hospitals, *Veterinary Economics*)

ROOM-BY-ROOM LISTING OF MATERIALS AND FINISHES		
ROOMS		**MATERIALS**
Exam Room	**Exam Room Floor**	Quarry tile (traction surface) with epoxy grout
		Sheet vinyl (minimum .080 gauge)
		Ceramic tile (traction surface) with epoxy grout
	Exam Room Walls	Gypsum board with painted surface
		Gypsum board with Type II vinyl wall covering
	Exam Room Ceiling	Lay-in type acoustical ceiling system (5/8" acoustical panels and steel grid)

5.4.2 Grading Lighting

Diffuse lighting is considered as major lighting for exam rooms. Therefore diffuse lighting is analyzed in the exam rooms for grading lightings. Lighting in exam rooms is graded according to lighting fixtures and openings. The illumination of the rooms by lighting fixtures is compared with the standards for housing and inspecting animals stated at Guidelines for Laboratory Animals by University of Minnesota. The openings of exam rooms are graded as giving 1 point to each 1 m^2 of that opening. These grades are considered as they indicate only daylight support to the lighting of the room whereas the fixtures provide the main illumination to that area. Lighting fixtures are graded 10 points if the illumination

which they provide to the room is convenient with the illumination level stated at the Guidelines. If it is not convenient with the Guidelines, lighting fixtures are graded between 0 and 10 points.

Required volume of diffuse light in the exam rooms is determined to be in the range of 130-325 lux according to The Guidelines for Laboratory Animals by University of Minnesota (Cited on the website of RAR, 2003). In addition, lighting requirements for animal rooms relating possible physical reactions in animals are also discussed in Guide for the Care and Use of Laboratory Animals, the accepted standard published by the National Academy of Sciences (NAS). The NAS Guide calls for a basic illumination level of 30 foot-candles (or 325 lux) one meter above the floor as sufficient for animal care without causing phototoxic reactions in most animals (Bohn, 1998). Consequently necessary illumination level is determined to be 325 lux which represents 10 points. Furthermore lighting fixtures which have diffuse light level in the range of 150-325 and 325-500 lux are graded between 0 and 10 points. The fixtures out of these ranges are graded 0 point. Since lighting levels over 500 lux mean glare whereas lighting levels below 150 lux mean insufficient lighting.

5.4.3 Grading Noise

Noise in exam rooms is measured with observations. Exam rooms are monitored by 3 subjects. Observations are graded over 10 points by subjects. 5 points is for the tolerable level of sound in the room. 10 point represents the maximum noise whereas 0 point means that there is no noise in the exam room. The noise level is determined by averaging the grades of 3 subjects.

5.4.4 Grading Odor

Ventilation in exam rooms is the main point for measuring odor. Odor in exam rooms is graded according to the observations and the openings for ventilation. The openings of exam rooms are graded as giving 1 point to each 1 m^2 of that

opening. These grades are compared with the grades of observations. Ventilation fixtures are evaluated with openings as support for ventilation of that area. Exam rooms are observed and graded by 3 subjects. Observations are graded over 10 points by these subjects. 5 points is for the tolerable level of odor in the room. 10 points represents the maximum odor whereas 0 point means that there is no odor in the exam room.

5.4.5 Analyzing Circulation

Circulation affects work efficiency in exam rooms as well as in other sections of the facility. Circulation paths are illustrated in plans to define circulation problems in the exam rooms of sample veterinary facilities. In addition, the plans are available to define the areas where personnel and clients use mostly in the exam rooms. Circulations in the exam rooms which represent two alternate considerations are analyzed with regard to these plans.

In plans, circulation paths are shown with curved lines (Figure 28). The curved lines in blue color represent circulation paths regarding specific function of exam rooms whereas the lines in red color represent circulation paths regarding other functions of exam rooms. There are three symbols in plans to demonstrate persons in the exam rooms (Figure 28). In addition, curved lines are illustrated in exam room plans as connected to one of these three symbols. Thus connection shows that curved line refers to that symbol. Symbols which represent persons in exam rooms take place below.

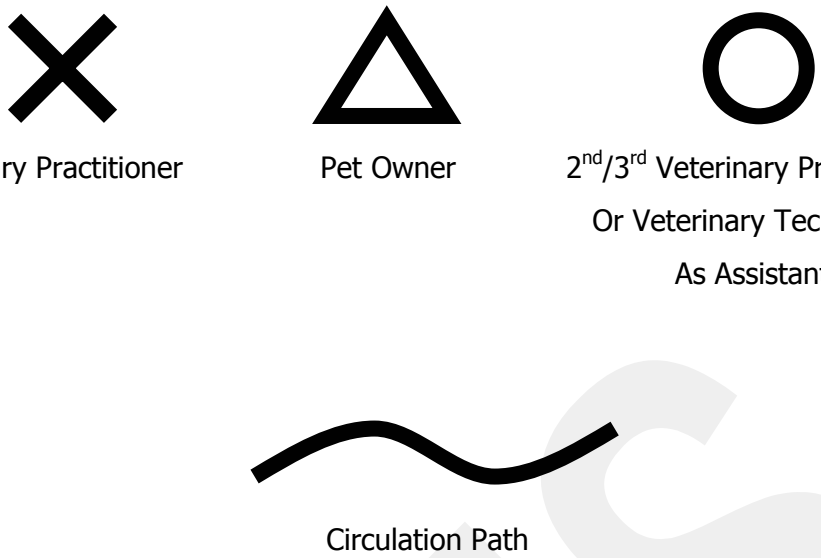

Figure 28. Symbols Which Are Illustrated in Exam Room Plans

5.5 Findings and Results

Findings and results of observations and surveys which are performed in the sample facilities are grouped in tables according to exam rooms. Circulation plans are also illustrated in this section.

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5.5.1 Observations and Surveys

Ankara Veterinary Medical Center:

Table 14, 15, 16 present findings and results of observations and surveys which are performed in the exam rooms of Ankara Veterinary Medical Center.

Table 14. Findings and Results of Observations and Surveys Which Are Performed in the "Exam Room I" in Ankara Veterinary Medical Center

ANKARA VETERINARY MEDICAL CENTER	Surfaces	Material		Light	Odor		Noise	
					Ventilation	Observations		Observations
Exam Room I	Ceiling	Plaster & Paint	Openings	110x110 cm window	110x110 cm opening leaf of window hinged at the bottom edge	Subject 1		Subject 1
	Floor	Ceramic Tile 60x30 cm Glaze, Plaster grout				6 points		4 points
	Wall	1-) Plaster & Paint (75% of the surface) 2-) Ground glassed partition (25% of the surface)	Fixtures	2 each 60x60 cm Florescent lamp unit with 4 light bar 18W54 Total Illumination 260 lux	Air Conditioner Mitsubishi SRK 328HENF	Subject 2		Subject 2
						5 points		3 points
	Furniture	Leather covered metal exam table, metal counter, metal and glass shelves, metal table				Subject 3		Subject 3
						4 points		3 points

Table 15. Findings and Results of Observations and Surveys Which Are Performed in the "Exam Room II" in Ankara Veterinary Medical Center

ANKARA VETERINARY MEDICAL CENTER	Surfaces	Material		Light	Odor		Noise
					Ventilation	Observations	Observations
Exam Room II	Ceiling	Plaster & Paint	Openings	110x110 cm window	110x110 cm opening leaf of window hinged at the bottom edge	Subject 1 4 points	Subject 1 1 point
	Floor	Ceramic tile 60x30 cm Glaze, Plaster grout					
	Wall	1-) Plaster & Paint (70% of the surface) 2-) Ground glassed partition (30% of the surface)	Fixtures	4 each 60x60 cm Florescent lamp unit with 4 light bar 18W54 Total Illumination 670 lux	—	Subject 2 2 points	Subject 2 1 point
	Furniture	Leather covered metal exam table, metal counter, metal and glass shelves, metal table				Subject 3 2 points	Subject 3 1 point

Table 16. Findings and Results of Observations and Surveys Which Are Performed in the "Exam Room III" in Ankara Veterinary Medical Center

ANKARA VETERINARY MEDICAL CENTER	Surfaces	Material		Light	Odor		Noise
					Ventilation	Observations	Observations
Exam Room III	Ceiling	Plaster & Paint	Openings	110x110 cm window	110x110 cm opening leaf of window hinged at the bottom edge	Subject 1	Subject 1
	Floor	Ceramic tile 60x30 cm Glaze, Plaster grout				2 points	1 point
	Wall	1-) Plaster & Paint (50% of the surface) 2-) Ground glassed partition (50% of the surface)	Fixtures	1 each 60x60 cm Florescent lamp unit with 4 light bar 18W54 Total Illumination 230 lux	—	Subject 2	Subject 2
						1 point	1 point
	Furniture	Counter with sink, leather covered metal exam table, metal counter, metal and glass shelves, metal table				Subject 3	Subject 3
						1 point	1 point

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Beysukent Veterinary Clinic:

Table 17 and 18 present findings and results of observations and surveys which are performed in the exam rooms of Beysukent Veterinary Clinic.

Table 17. Findings and Results of Observations and Surveys Which Are Performed in the "Exam Room I" in Beysukent Veterinary Clinic

BEYSUKENT VETERINARY CLINIC	Surfaces	Material		Light	Odor		Noise
					Ventilation	Observations	Observations
Exam Room I	Ceiling	Plaster & Paint	Openings	1-) 2 each 65x65 cm window, 2-) 65x190 cm glass door	1-) 2 each 65x65 cm opening leaf of window, 2-) 65x190 cm glass door	Subject 1	Subject 1
	Floor	Ceramic tile 33x33 cm Matt, Plaster grout				2 points	3 points
	Wall	1-) Ceramic tile 10x10 cm Glaze (90% of the surface), Plaster grout 2-) Glass brick (10% of the surface)	Fixtures	3 each 60x60 cm Florescent lamp unit with 4 light bar F18W54 General Electric Total Illumination 500 lux	—	Subject 2	Subject 2
						1 point	2 points
	Furniture	Metal exam table, metal counter with a sink, metal shelves and metal cabinet for pharmacy				Subject 3	Subject 3
						2 points	2 points

Table 18. Findings and Results of Observations and Surveys Which Are Performed in the "Exam Room II" in Beysukent Veterinary Clinic

<table>
<tr><td rowspan="2">BEYSUKENT VETERINARY CLINIC</td><td rowspan="2">Surfaces</td><td rowspan="2">Material</td><td rowspan="2"></td><td rowspan="2">Light</td><td colspan="2">Odor</td><td>Noise</td></tr>
<tr><td>Ventilation</td><td rowspan="2">Observations</td><td rowspan="2">Observations</td></tr>
<tr><td rowspan="5">Exam Room II</td><td>Ceiling</td><td>Plaster & Paint</td><td rowspan="2">Openings</td><td rowspan="2">1-) 65x65 cm window,
2-) 65x190 cm glass door</td><td rowspan="2">1-) 65x65 cm opening leaf of window,
2-) 65x190 cm glass door</td></tr>
<tr><td>Floor</td><td>Ceramic tile 33x33 cm Matt, Plaster grout</td><td>Subject 1</td><td>Subject 1</td></tr>
<tr><td rowspan="3">Wall</td><td rowspan="3">Plaster & Paint</td><td rowspan="3">Fixtures</td><td rowspan="3">1 each 60x30 cm Florescent lamp unit with 2 light bar 18W/765 Osram
Total Illumination 110 lux</td><td>3 points</td><td>2 points</td></tr>
<tr><td rowspan="3">—</td><td>Subject 2</td><td>Subject 2</td></tr>
<tr><td>2 points</td><td>1 points</td></tr>
<tr><td>Furniture</td><td>Metal exam table, metal cart, wooden cabinet and sink</td><td>Subject 3</td><td>Subject 3</td></tr>
<tr><td colspan="3"></td><td>2 points</td><td>1 points</td></tr>
</table>

Ankyra Animal Hospital:

Table 19 and 20 present findings and results of observations and surveys which are performed in the exam rooms of Ankyra Animal Hospital.

Table 19. Findings and Results of Observations and Surveys Which Are Performed in the "Exam Room I" in Ankyra Animal Hospital

ANKYRA ANIMAL HOSPITAL	Surfaces	Material		Light	Odor		Noise
					Ventilation	Observations	Observations
Exam Room I	Ceiling	Plaster & Paint	Openings	—	—	Subject 1 2 points	Subject 1 5 points
	Floor	Ceramic tile 33x33 cm Glaze, Plaster grout					
	Wall	1-) Plaster & Paint (40% of the surface), 2-) Ceramic tile 14x14 cm Glaze (60% of the surface), Plaster grout	Fixtures	1 each 60x60 cm Florescent lamp unit with 4 light bar 18W54 Phillips Total Illumination 200 lux	Air Conditioner Arcelik MonoSplit 4710 AA	Subject 2 2 points	Subject 2 5 points
	Furniture	Metal cart for EKG, metal exam table, metal fridge and glass cabinet for pharmacy				Subject 3 2 points	Subject 3 6 points

Table 20. Findings and Results of Observations and Surveys Which Are Performed in the "Exam Room II" in Ankyra Animal Hospital

ANKYRA ANIMAL HOSPITAL	Surfaces	Material		Light	Odor		Noise
					Ventilation	Observations	Observations
Exam Room II	Ceiling	Plaster & Paint	Openings	—	—	Subject 1 3 points	Subject 1 4 points
	Floor	Ceramic tile 33x33 cm, Glaze, Plaster grout					
	Wall	1-) Plaster & Paint (40% of the surface), 2-) Ceramic tile 14x14 cm Glaze (60% of the surface), Plaster grout	Fixtures	1 each 60x60 cm Florescent lamp unit with 4 light bar 18W54 Phillips Total Illumination 200 lux	Air Conditioner Arcelik MonoSplit 4710 AA	Subject 2 2 points	Subject 2 3 points
	Furniture	Wooden cabinet metal exam table, metal ultrasound cart and metal dental unit				Subject 3 2 points	Subject 3 4 points

Çayyolu Veterinary Clinic:

Table 21 and 22 present findings and results of observations and surveys which are performed in the exam rooms of Çayyolu Veterinary Clinic.

Table 21. Findings and Results of Observations and Surveys Which Are Performed in the "Exam Room I" in Çayyolu Veterinary Clinic

ÇAYYOLU VETERINARY CLINIC	Surfaces	Material		Light	Odor		Noise
					Ventilation	Observations	Observations
Exam Room I	Ceiling	Plaster & Paint	Openings	1-) 65x110 cm window, 2-) 65x200 cm glass door	65x200 cm glass door	Subject 1	Subject 1
	Floor	Sheet vinyl (PVC)				7 points	7 points
	Wall	Plaster & Paint	Fixtures	1 each 60x60 cm Florescent lamp unit with 4 light bar TLD18W54 Total Illumination 165 lux	—	Subject 2	Subject 2
						4 points	5 points
	Furniture	Metal exam table, metal cage, wooden cabinet, glass tables, sink and wooden cabinet for pharmacy				Subject 3	Subject 3
						5 points	4 points

Table 22. Findings and Results of Observations and Surveys Which Are Performed in the "Exam Room II" in Çayyolu Veterinary Clinic

ÇAYYOLU VETERINARY CLINIC	Surfaces	Material		Light	Odor		Noise
					Ventilation	Observations	Observations
Exam Room II	Ceiling	Plaster & Paint	Openings	110x110 cm window	50x110 cm opening leaf of window		
	Floor	Wooden floor made of 30x5 cm tiles				Subject 1 3 points	Subject 1 5 points
	Wall	Plaster & Paint	Fixtures	1 each Florescent bulb 23W800 Osram Total Illumination 43 lux	—	Subject 2 1 points	Subject 2 4 points
	Furniture	Metal exam tables, plastic cabinets for pharmacy				Subject 3 2 points	Subject 3 3 points

5.5.2 Circulation Plans

Ankara Veterinary Medical Center:

Figure 29, 30, 31 present circulation plans of exam rooms in Ankara Veterinary Medical Center. "Exam Room I" and "Exam Room II" "Exam Room III" are the exam rooms with specific function.

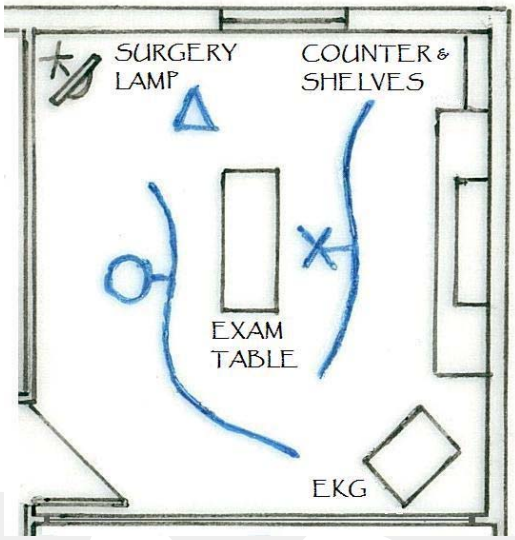

Figure 29. Circulation Plan of the "Exam Room I" (Exam Room with Specific Function) in Ankara Veterinary Medical

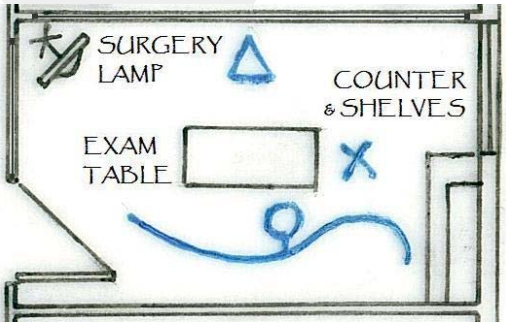

Figure 30. Circulation Plan of the "Exam Room II" (Exam Room with Specific Function) in Ankara Veterinary Medical

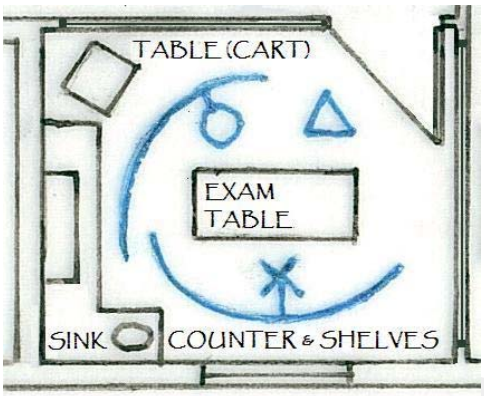

Figure 31. Circulation Plan of the "Exam Room III" (Exam Room with Specific Function) in Ankara Veterinary Medical

Beysukent Veterinary Clinic:

Figure 32 and 33 present circulation plans of exam rooms in Beysukent Veterinary Clinic. "Exam Room I" and "Exam Room II" are the exam rooms with specific function.

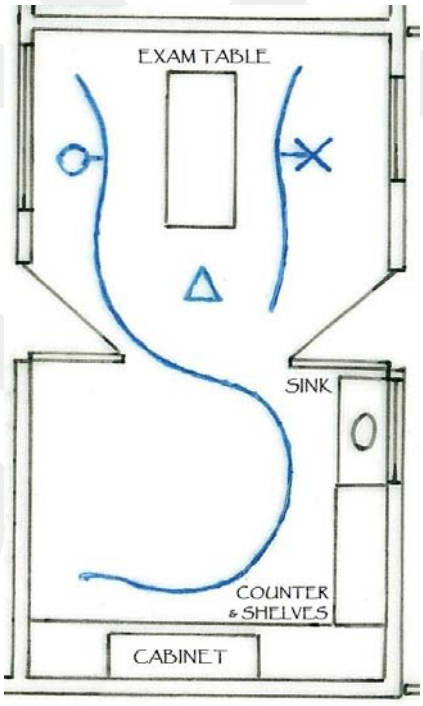

Figure 32. Circulation Plan of the "Exam Room I" (Exam Room with Specific Function) in Beysukent Veterinary Clinic

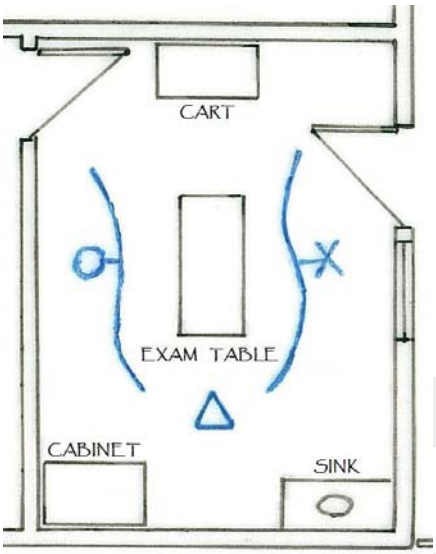

Figure 33. Circulation Plan of the "Exam Room II" (Exam Room with Specific Function) in Beysukent Veterinary Clinic

Ankyra Animal Hospital:

Figure 34 and 35 present circulation plans of exam rooms in Ankyra Animal Hospital. "Exam Room I" is the exam room with specific function whereas "Exam Room II" stands as the exam room with multi-function.

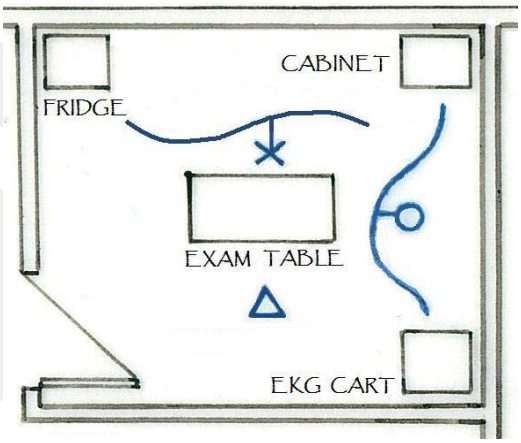

Figure 34. Circulation Plan of the "Exam Room I" (Exam Room with Specific Function) in Ankyra Animal Hospital

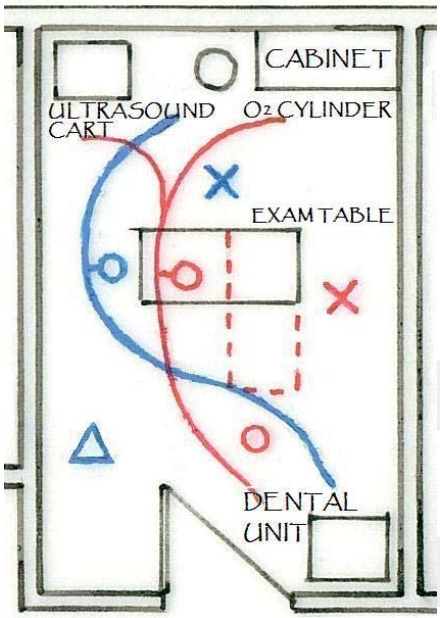

Figure 35. Circulation Plan of the "Exam Room II" (Exam Room with Multi-Function: Emergency Care) in Ankyra Animal Hospital

Çayyolu Veterinary Clinic:

Figure 36 and 37 present circulation plans of exam rooms in Çayyolu Veterinary Clinic. "Exam Room I" and "Exam Room II" stand as the exam rooms with multi-function.

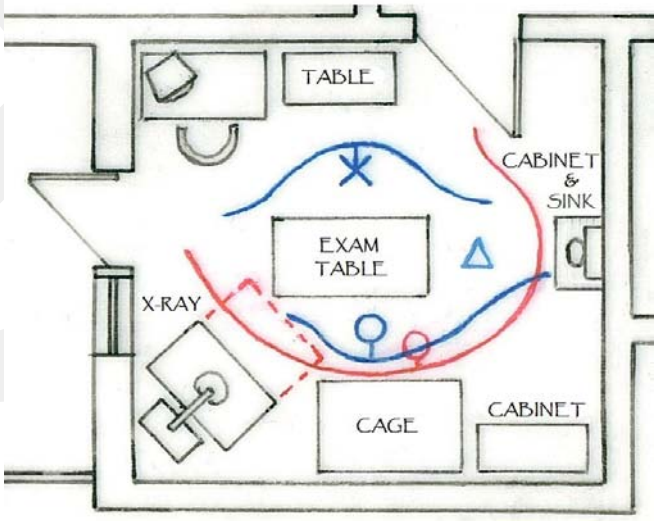

Figure 36. Circulation Plan of the "Exam Room I" (Exam Room with Multi-Function: X-ray and Animal Holding) in Çayyolu Veterinary Clinic

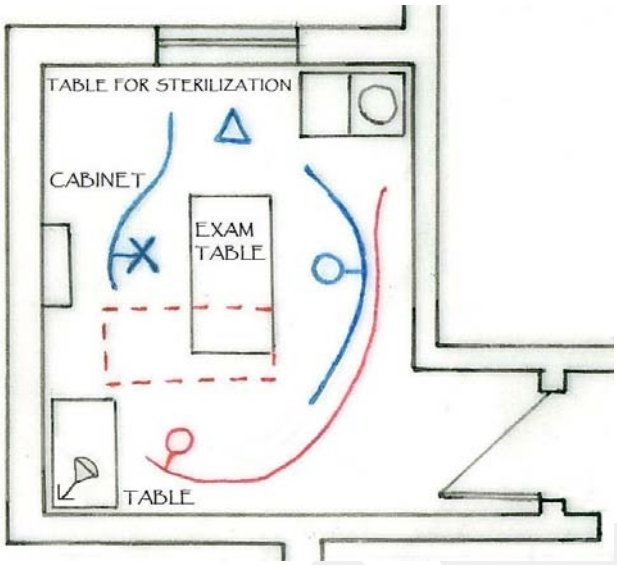

Figure 37. Circulation Plan of the "Exam Room II" (Exam Room with Multi-Function: Surgery and Sterilization) in Çayyolu Veterinary Clinic

5.6 Evaluating Results

Regarding the findings and results, exam rooms of two alternate considerations are graded. Grading depends upon different units. Points are given considering these units such as square meter for openings and lux for fixtures of lighting. Moreover lighting fixtures in exam rooms are graded according to the illumination levels calculated by experts in lighting from Philips Company, Istanbul. On the other hand, observations are made by three subjects who are an urban designer, a teacher and an interior architect. Besides openings, ventilation fixtures in exam rooms are accepted as a support to the rooms' ventilation for eliminating odor. Thus ventilation fixtures are illustrated as "+" in tables. Tables 23 to 31 show the grades given according to criteria.

Ankara Veterinary Medical Center:

Table 23, 24, 25 present grades of the exam rooms in Ankara Veterinary Medical Center;

Table 23. Grades of the "Exam Room I" in Ankara Veterinary Medical Center

ANKARA VETERINARY MEDICAL CENTER	Surfaces	Material		Light	Odor			Noise
					Ventilation		Observations	Observations
Exam Room I	Ceiling	0 points	Openings	1.2 points	Openings	1.2 points	Subjects' Average point	Subjects' Average point
	Floor	5 points					5 points	3.3 points
	Wall	7.5 points	Fixtures	6.8 points	Fixtures	+		

Table 24. Grades of the "Exam Room II" in Ankara Veterinary Medical Center

ANKARA VETERINARY MEDICAL CENTER	Surfaces	Material		Light	Odor			Noise
					Ventilation		Observations	Observations
Exam Room II	Ceiling	0 points	Openings	1.2 points	Openings	1.2 points	Subjects' Average point	Subjects' Average point
	Floor	5 points					2.6 points	1 point
	Wall	7 points	Fixtures	0 point	Fixtures	—		

Table 25. Grades of the "Exam Room III" in Ankara Veterinary Medical Center

<table>
<tr><td rowspan="2">ANKARA VETERINARY MEDICAL CENTER</td><td rowspan="2">Surfaces</td><td rowspan="2">Material</td><td rowspan="2"></td><td rowspan="2">Light</td><td colspan="3">Odor</td><td>Noise</td></tr>
<tr><td colspan="2">Ventilation</td><td>Observations</td><td>Observations</td></tr>
<tr><td rowspan="3">Exam Room III</td><td>Ceiling</td><td>0 points</td><td rowspan="2">Openings</td><td rowspan="2">1.2 points</td><td rowspan="2">Openings</td><td rowspan="2">1.2 points</td><td rowspan="2">Subjects' Average point</td><td rowspan="2">Subjects' Average point</td></tr>
<tr><td>Floor</td><td>5 points</td></tr>
<tr><td>Wall</td><td>5 points</td><td>Fixtures</td><td>5.3 points</td><td>Fixtures</td><td>—</td><td>1.3 points</td><td>1 point</td></tr>
</table>

Beysukent Veterinary Clinic:

Table 26 and 27 present grades of the exam rooms in Beysukent Veterinary Clinic;

Table 26. Grades of the "Exam Room I" in Beysukent Veterinary Clinic

<table>
<tr><td rowspan="2">BEYSUKENT VETERINARY CLINIC</td><td rowspan="2">Surfaces</td><td rowspan="2">Material</td><td rowspan="2"></td><td rowspan="2">Light</td><td colspan="3">Odor</td><td>Noise</td></tr>
<tr><td colspan="2">Ventilation</td><td>Observations</td><td>Observations</td></tr>
<tr><td rowspan="3">Exam Room I</td><td>Ceiling</td><td>0 points</td><td rowspan="2">Openings</td><td rowspan="2">2 points</td><td rowspan="2">Openings</td><td rowspan="2">2 points</td><td rowspan="2">Subjects' Average point</td><td rowspan="2">Subjects' Average point</td></tr>
<tr><td>Floor</td><td>2.5 points</td></tr>
<tr><td>Wall</td><td>0 points</td><td>Fixtures</td><td>1 point</td><td>Fixtures</td><td>—</td><td>1.6 points</td><td>2.3 points</td></tr>
</table>

Table 27. Grades of the "Exam Room II" in Beysukent Veterinary Clinic

BEYSUKENT VETERINARY CLINIC	Surfaces	Material		Light	Odor			Noise
					Ventilation		Observations	Observations
Exam Room II	Ceiling	0 points	Openings	1.7 points	Openings	1.7 points	Subjects' Average point	Subjects' Average point
	Floor	2.5 points					2.3 points	1.3 points
	Wall	10 points	Fixtures	0 point	Fixtures	—		

Ankyra Animal Hospital:

Table 28 and 29 present grades of the exam rooms in Ankyra Animal Hospital;

Table 28. Grades of the "Exam Room I" in Ankyra Animal Hospital

ANKYRA ANIMAL HOSPITAL	Surfaces	Material		Light	Odor			Noise
					Ventilation		Observations	Observations
Exam Room I	Ceiling	0 points	Openings	0 points	Openings	0 points	Subjects' Average point	Subjects' Average point
	Floor	5 points					2 points	5.3 points
	Wall	4 points	Fixtures	3.8 points	Fixtures	+		

Table 29. Grades of the "Exam Room II" in Ankyra Animal Hospital

ANKYRA ANIMAL HOSPITAL	Surfaces	Material		Light	Odor			Noise
					Ventilation		Observations	Observations
Exam Room II	Ceiling	0 points	Openings	0 points	Openings	0 points	Subjects' Average point	Subjects' Average point
	Floor	5 points					2.3 points	3.6 points
	Wall	4 points	Fixtures	3.8 points	Fixtures	+		

Çayyolu Veterinary Clinic:

Table 30 and 31 present grades of the exam rooms in Çayyolu Veterinary Clinic;

Table 30. Grades of the "Exam Room I" in Çayyolu Veterinary Clinic

ÇAYYOLU VETERINARY CLINIC	Surfaces	Material		Light	Odor			Noise
					Ventilation		Observations	Observations
Exam Room I	Ceiling	0 points	Openings	2 points	Openings	1.3 points	Subjects' Average point	Subjects' Average point
	Floor	10 points					5.3 points	5.3 points
	Wall	10 points	Fixtures	1.8 points	Fixtures	—		

Table 31. Grades of the "Exam Room II" in Çayyolu Veterinary Clinic

<table>
<tr><td rowspan="2">ÇAYYOLU VETERINARY CLINIC</td><td rowspan="2">Surfaces</td><td rowspan="2">Material</td><td rowspan="2"></td><td rowspan="2">Light</td><td colspan="3">Odor</td><td>Noise</td></tr>
<tr><td colspan="2">Ventilation</td><td rowspan="2">Observations</td><td rowspan="2">Observations</td></tr>
<tr><td rowspan="3">Exam Room II</td><td>Ceiling</td><td>0 points</td><td rowspan="2">Openings</td><td rowspan="2">1.2 points</td><td rowspan="2">Openings</td><td rowspan="2">0.6 points</td><td>Subjects' Average point</td><td>Subjects' Average point</td></tr>
<tr><td>Floor</td><td>0 points</td><td rowspan="2">2 points</td><td rowspan="2">4 points</td></tr>
<tr><td>Wall</td><td>10 points</td><td>Fixtures</td><td>0 point</td><td>Fixtures</td><td>—</td></tr>
</table>

When grades of finishing materials which are used on interior surfaces of the sample veterinary facilities are analyzed, it is seen that none of the facilities use proper materials on ceiling surfaces. Plaster and paint are used as finishing material on concrete ceiling surfaces of all exam rooms. Therefore they are graded 0 point. According to the Checklist developed by Dan Chapel (2004), acoustical suspended ceiling which is made of acoustical panels and steel grids is the necessary ceiling system for exam rooms (Table 13). The highest and the lowest grades which are 10 and 0 are given for the materials used on floors in multi-function exam rooms of Çayyolu Veterinary Clinic. The first exam room of this facility is graded 10 points for sheet vinyl (Table 30) but the second room is graded 0 point for wooden floor (Table 31). Regarding wall materials, 10 points are given to the second exam room of Beysukent Veterinary Clinic due to plaster and paint (Table 27) while the first room of this facility receives 0 point since ceramic tile and glass brick are invalid for the Checklist (Table 26). Moreover both multi-function exam rooms of Çayyolu Veterinary Clinic receive 10 points for their wall surfaces due to plaster and paint.

Lighting in exam rooms is another concern for sample veterinary facilities. The highest grade which is 6.8 points for lighting fixture is given to exam room with specific function in Ankara Veterinary Medical Center (Table 23) while the adjacent exam room with specific function receives the lowest grade which is 0 point due to level of light over limits (Table 24). These two rooms have the same grade for openings which is 1.2 point that provides daylight moderately. Moreover ground glassed partitions in these exam rooms are fairly useful for light transmission from one room to another, however the material is not valid for walls according to the Checklist developed by Dan Chapel. On the other hand, 2 points is the highest grade given for an opening and it is given to exam room with specific function in Beysukent Veterinary Clinic (Table 26) and multi-function exam room of Çayyolu Veterinary Clinic (Table 30). The openings in the exam room of Beysukent Veterinary Clinic provide adequate level of daylight into the room. Conversely, illumination in the same room with fixtures is graded 1 point since the fixtures provide the room with high level of light (500 lux) which may cause glare and phototoxic reactions in animals (Table 26). Lighting level is graded 0 point in the second exam room of Beysukent Veterinary Clinic since fixtures provide inadequate level of light into the room (Table 27). Although there is no any opening for daylight in the exam rooms of Ankyra Animal Hospital, lighting fixtures in both multi-function and specific function exam rooms of this facility provide the same illumination which is 3.8 points (Table 28 and 29). Light levels in these rooms are higher than other facilities except Ankara Veterinary Medical Center (Table 23). In addition, while the first multi-function exam room in Çayyolu Veterinary Clinic is graded 2 points as the highest grade for an opening, the same room may have problem with artificial lighting which is graded 1.8 points (Table 30). The second exam room of the same facility receives 0 point since the lighting fixtures provide inadequate level of light into the room (Table 31).

Odor in all exam rooms of the sample veterinary facilities except Çayyolu Veterinary Clinic did not exceed tolerable limits. The highest grade which is 5.3 points is given to the first multi-function exam room in Çayyolu Veterinary Clinic

however the room is ventilated with openings moderately (Table 30). This room is used also for holding animals besides its specific function. Therefore odor becomes a problem in this multi-function exam room. Another problem with regard to odor is designing an exam room close to laboratory in a veterinary facility. The first exam room with specific function in Ankara Veterinary Medical Center is located next to laboratory (Figure 20). Although the exam room is ventilated with both an air-conditioner and an opening which is graded 1.2 points, odor level in this room is just in tolerable limits and it is graded 5 points in observations (Table 23). The third exam room with specific function in Ankara Veterinary Medical Center is graded 1.3 points in observations which means the minimum odor level in all veterinary facilities (Table 25). In addition, air-conditioners in exam rooms of Ankyra Animal Hospital have an effect on odor reduction in the rooms which has no opening for natural air circulation (Table 28 and 29).

Noise, similar to odor problem, is seen as another problem for multi-function exam rooms. High level of sound is observed in most multi-function exam rooms however the maximum noise is graded just above tolerable limits. The first multi-function exam room in Çayyolu Veterinary Clinic is graded 5.3 (Table 30) and the second one is graded 4 points (Table 31). Noise level in the first room seems as a result of animal holding. Moreover the noise in the first room of this facility has an effect on the noise in the second exam room. Similar situation is observed in Ankyra Animal Hospital. Although dwelling zone is designed in basement floor of the facility, noise generated in basement floor affects the noise level in both exam rooms of Ankyra Animal Hospital. Exam room with specific function in this facility is graded 5.3 points (Table 28) while multi-function exam room receives 3.6 points (Table 29).

As it is seen in diagrams, work efficiency in exam rooms is affected from size of the room, design in the room and some extra functions of the room. The plan of the first exam room in Beysukent Veterinary Clinic shows that the circulation of assistant is extremely affected from design in the room (Figure 32). All

equipments and tools are located in immobile furniture which is designed at one side of the room. On the other hand, exam table is located at other side of the room. Therefore this design for the room makes walkway of the assistant working around the table longer and creates unnecessary circulation. Similar design approach is seen in the third exam room of Ankara Veterinary Medical Center (Figure 31). But design in this room helps assistant and veterinary practitioner to reach the tools and equipments in immobile furniture from exam table. Size of the room is the advantage for the personnel working in this room. One of the solutions to avoid unnecessary circulations is to use mobile furniture. Carts are useful to carry tools and equipments such as EKG, ultrasound, mini-fridge and dental units as it is seen in the exam room with specific function in Ankyra Animal Hospital (Figure 34). When the multi-function exam room in Ankyra Animal Hospital is used for emergency care as a second function, two assistants and a veterinary practitioner work together (Figure 35). Thus position of the exam table is changed to allow second assistant move in the room. While the first assistant helps the doctor, the second assistant makes three way circulations. When the room is used for the second function, circulation becomes dense. Dental unit is not used often for emergency cases in multi-function exam room in Ankyra Animal Hospital. Even though dental unit is mobile, location of this equipment may create unnecessary circulation. This affects the room when it is used for its specific function as well. On the other hand, size of the first exam room in Çayyolu Veterinary Clinic is the major problem for personnel to use the room with all functions together (Figure 36). While the cage for animal holding and X-ray unit occupy a lot of space in the room, they cause extra circulations for the personnel as well. Plans show that when X-ray unit is in use, interruptions in circulation occur in this exam room. If extra functions are eliminated, circulations will not be interrupted. The second exam room is also used for other functions as well as the first room (Figure 37). The room is used for sterilization and operations besides its specific function. Considering that sterilization unit is not used as often as other equipments during medical care to animals, circulations in the room are reasonable. On the other hand, it should not be ignored that the operation room needs to be designed in a specific area separately. Therefore the

second room of Çayyolu Veterinary Clinic needs to be used as an exam room basically.

5.7 Comparison of Multi-Function Exam Rooms with Specific Function Exam Rooms

The grades are presented in Table 32 and 33 according to multi-function exam rooms and exam rooms with specific function. These are the grades of two alternate considerations. Multi-function exam rooms include the second exam room of Ankyra Animal Hospital and both exam rooms of Çayyolu Veterinary Clinic. Exam rooms with specific function include exam rooms of Ankara Veterinary Medical Center, Beysukent Veterinary Clinic and the first exam room of Ankyra Animal Hospital.

Table 32. Grades of Exam Rooms with Multi-Function

<table>
<tr><td rowspan="2">EXAM ROOMS WITH MULTI-FUNCTION</td><td rowspan="2">Surfaces</td><td rowspan="2">Material</td><td rowspan="2"></td><td rowspan="2">Light</td><td colspan="3">Odor</td><td>Noise</td></tr>
<tr><td colspan="2">Ventilation</td><td>Observations</td><td>Observations</td></tr>
<tr><td rowspan="4">Exam Rooms</td><td>Ceiling</td><td>0 points</td><td rowspan="3">Openings</td><td rowspan="3">1 points</td><td rowspan="3">Openings</td><td rowspan="3">0.6 points</td><td>Average point</td><td>Average point</td></tr>
<tr><td>Floor</td><td>5 points</td><td rowspan="2">3.2 points</td><td rowspan="2">4.3 points</td></tr>
<tr><td>Wall</td><td>8 points</td><td>Equipments</td><td>Equipments</td><td>+</td></tr>
</table>

Table 33. Grades of Exam Rooms with Specific Function

<table>
<tr><td rowspan="2">EXAM ROOMS WITH A SPECIFIC FUNCTION</td><td rowspan="2">Surfaces</td><td rowspan="2">Material</td><td rowspan="2"></td><td rowspan="2">Light</td><td colspan="3">Odor</td><td>Noise</td></tr>
<tr><td colspan="2">Ventilation</td><td rowspan="2">Observations</td><td rowspan="2">Observations</td></tr>
<tr><td rowspan="4">Exam Rooms</td><td>Ceiling</td><td>0 points</td><td rowspan="2">Openings</td><td rowspan="3">1.2 points</td><td rowspan="2">Openings</td><td rowspan="2">1.2 points</td></tr>
<tr><td rowspan="2">Floor</td><td rowspan="2">4.2 points</td><td>Average point</td><td>Average point</td></tr>
<tr><td rowspan="2">2.5 points</td><td rowspan="2">2.4 points</td></tr>
<tr><td>Wall</td><td>5.6 points</td><td>Equipments</td><td>Equipments</td><td>++</td></tr>
</table>

With regard to materials, Table 32 and 33 show that exam rooms of both considerations are unsuccessful in ceiling materials. Acoustical suspended ceiling should be considered in all exam rooms. Furthermore this ceiling system provides required space for equipments of ventilation and lighting besides it minimizes noise level in the rooms. Multi-function exam rooms seem more successful than exam rooms with specific function in material preferences for floors and walls (Table 32). However the grades of multi-function exam rooms for floors are necessary to be higher considering that the materials in these exam rooms may wear out quicker than other places.

Inadequate lighting is the problem which is observed in the exam rooms of both considerations. General lighting level in exam rooms with specific function is slightly higher than multi-function exam rooms (Table 33). Diffuse lighting level in all exam rooms is either higher than limits or lower than limits. Multi-function

exam rooms include lighting levels which is lower than limits whereas the exam rooms with specific function mostly contain higher lighting level than limits.

It is observed that odors in the exam rooms of both considerations do not exceed tolerable limit. Exam rooms with specific function include more openings and ventilation fixtures (Table 33). Therefore odor levels in these rooms are lower than the odor levels in multi-function exam rooms. Moreover multi-function exam rooms have a high risk to produce more odors in order that they are required to be ventilated well accordingly.

When the exam rooms of both considerations are compared with each other regarding noise levels, multi-function exam rooms suffer from noise more than exam rooms with specific function (Table 32). Multi-function exam rooms have such problems to control noise level. If these rooms include animal holding within, noise may become a major problem together with odor. Consequently the type of extra function which a room includes is very important to avoid these problems.

Circulation paths in plans show that the main problem which occurs in circulation is designs in the exam rooms. Location of immobile furniture in most rooms causes unnecessary circulations for personnel. This is the problem also for exam rooms with specific function. Multi-function means more circulation in the rooms. It is seen that multi-function exam rooms try to avoid this problem by changing the position of some furniture according to different functions of the room. Another solution to avoid dense circulation is to use more immobile furniture such as carts which carry tools, equipments and several units. The exam rooms with specific function may seem they have an advantage to solve circulation problems but location of immobile furniture needs to be the point to be paid attention in design of all exam rooms.

5.8 Discussion

This study shows that material choice and lighting are the common problems which are mostly observed in the exam rooms of both considerations. On the other hand, odor, noise and most circulation problems are observed mainly in the multi-function exam rooms. Ceiling surface seems primarily ignored in all exam rooms of the sample veterinary facilities. Acoustical suspended ceiling generates the greatest problem for the facilities which were rented or bought. Since the ceilings were not designed accordingly, this ceiling system becomes difficult to be applied. Considering that this ceiling system may include ventilation and lighting fixtures within, exam rooms without acoustical suspended ceiling system may be subjected to the problems of odor, noise and lighting. Multi-function exam rooms may be preferred considering that they provide space efficiency. Unless circulation paths are organized well for all functions of the room, multi-function exam rooms reduce the work efficiency in companion animal facilities.

An ideal exam room for veterinary practitioners who plan to set up a companion animal facility in Turkey is an exam room with a specific function unless they have a chance to build their own buildings. As it is described in the study, multi-function exam rooms seem to have high risk in creating problems especially the problems of odor, noise and circulation. Unfortunately most of the veterinary practitioners practice their work in the facilities which they rented or bought. Therefore designs in exam rooms of these facilities are limited by constructions and depend on the conditions of the buildings. Because of the limited spaces in the facility, pet hospitals may have to contain multi-purpose rooms such as multi-function exam rooms. This is the main reason of such problems which occur in multi-function exam rooms in Turkey. Multi-function exam rooms should be designed in design of veterinary facilities. This is the most effective way to avoid the problems and therefore exam rooms may function well for multi-purposes. Otherwise, veterinarians and designers should consider and prefer exam rooms with specific function for the buildings which were rented or bought.

CHAPTER 6

CONCLUSION

By means of this study, factors affecting the design of a pet hospital, its importance, and the points to be taken into consideration are explained. Designers and veterinarians must be aware of the factors that affect the productivity of such facilities. In connection with the issues mentioned above, human, animal and environmental health and safety are related with this matter as well. Therefore planers must make all effort in designing pet hospitals.

There are some utmost important factors which affect design of pet hospitals and elimination of potential problems. Location is the first issue to be analyzed in hospital planning. Locations must be selected in such places where people may easily reach. Second important factor is the exterior environment. This reflects the quality and profession of the utility. Interior factors of pet hospitals include some vital points. Noise is one of the important point and be regarded. Noise bothers and interrupts customers and personnel as well as animals which are more sensitive than human beings. Another point is odor matter. Therefore designers are responsible to establish facilities to control the odor and noise level in pet hospitals. Lighting is also vital important in view of pets and personnel working there in. Design of lightings influences on performance of those people. Lighting cycle and amount is to be planned as to be convenient with pet biology.

Ventilation of pet hospitals is required for a pleasant and comfortable environment. Heat and moisture must be kept by ventilation systems to provide utmost adoptable living area for pets and people. In addition to prevent people from sick-building syndrome which is caused by interior air pollution, ventilation systems should never be denied. Within the interior factors; human, pet, material, supply items and waste circulation must be studied as required by pet hospital planners. False circulation may cause infection and contagious disease as well as reduction in personnel efficiency. Selection of appropriate materials is another important factor in view of neatness, cleanliness and maintenance field. This fact will reduce spread of contagious diseases and will help in quick healing of pets. In addition, this will also help in providing ambiance of customers and creating warm environment.

Apart from above, the following considerations need to be viewed in designing pet hospitals. Such considerations must be studied under the headlines "greeting zone", "working zone" and "dwelling zone". Greeting zone is the most significant area in pet hospitals. This area involves all sections of the hospital with regard to customers.

Exam room is the most important section to be reviewed. Because this shows the quality of the service to be provided and give impression to the customers as cited in the case study. However, especially in Turkey, the exam room is the troublesome area in pet hospitals. Exam rooms have been analyzed in view of the most complicated problems in the case study. Other sections in the hospital may be analyzed in different case studies.

Working zone is the heart of pet hospitals. Designers must very well organize this section for inter-communication with other zones and circulation purposes. Design of dwelling zone should include daily maintenance, cleanliness and must insure

comfort and peace of pets. This will also provide quick recovery and healthiness of patients.

In conclusion, pet hospitals have an important role in common health and environment policy of the nation. Therefore designers must be very conscientious in improving their projects. This study can be utilized if required as a source in planning animal health care facilities. Such facilities will enhance people's view about the environment and health care as well.

Some future implications can be the first to point out the main concerns about pets in Turkey. By this way it may become possible to suggest some solutions to veterinary clinics. Credit given to animals is assumed as the credits given to welfare of mankind and people. Therefore designers bear a great responsibility in planning animal health care facilities.

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