FEAR FREE® HOSPITAL DESIGN GUIDELINE

Heather E. Lewis, AIA, NCARB, AAA

October 2022

PREPARED BY

ANIMAL ARTS
architecture · animals · people

FEAR FREE
Taking the pet out of petrified.


FEAR FREE
Taking the pet out of petrified.

TABLE OF CONTENTS


FEAR FREE
Taking the pet out of petrified.

Introduction

Veterinarians are trained to protect the health and physical wellness of their animal patients, but psychological wellness issues have often been discounted or gone unnoticed. Fear is damaging to a pet's well-being, in both the short and long term. Fearful pets may not go to the veterinarian as often as needed due to their owners' reluctance to cause them stress. Also, animals may have physical problems that are masked by psychological distress, making a veterinary exam less effective.

Fear Free hospitals break the cycle of fear and its damaging effects by providing approaches to create positive, Fear Free relationships between pets and veterinary practices. This is great for pets and great for veterinary businesses.

The Fear Free movement has borrowed not only from the wealth of knowledge among animal behaviorists, animal welfare advocates, and numerous veterinary specialists, but also from human pediatric medicine. Animals and children are dependent beings and they require finesse and kindness in order to be treated effectively. "Children's hospitals now strive to provide some degree of autonomy to their patients—they recognize that struggle and restraint worsen stress and make sick kids sicker. If we veterinarians follow the same principles and apply a set of basic rules to all eight parts of a veterinary visit, we can make some profound changes." (Overall).

To support Fear Free practices, we need Fear Free hospitals. A well-designed building is a veterinarian's most important tool. The physical spaces can reinforce success when they are designed through the eyes of animals and they support Fear Free business practices.

The Fear Free Hospital Design Guideline sets the bar for the physical requirements of Fear Free hospitals. A credit system has been developed to ensure that minimum standards are met. For accreditation, a practice must meet four mandatory standards and achieve 320 out of total 700 optional design criteria credits. Refer to the Fear Free Design Checklist at the beginning of this guideline. Credits are divided into the following six categories:

- Fear Free Plans
- Fear Free Design for Dogs
- Fear Free Design for Cats
- Fear Free Housing
- Fear Free Lighting and Sound Engineering
- Fear Free Mechanical Engineering

Each of these categories represents up to ten unique components that together create the Fear Free hospital.


FEAR FREE
Taking the pet out of petrified.

Fear Free Design Options CHECKLIST

A Plans General

ACHIEVED		
☐	1A	Eliminate the Waiting Room
☐	1B	Non-Audible Paging Systems
☐	1C	Enter Directly into Exam Rooms from Outside
☐	02	Exterior Covered Greeting Area
☐	03	Outdoor Covered Unloading
☐	04	Outdoor Covered Waiting
☐	05	Entry Vestibule (if #1 is not possible)
☐	06	Separate Lobbies for Dogs and Cats (if no #1)
☐	07	Separate Treatment Areas for Dogs and Cats
☐	08	Separate Wards for Dogs and Cats
☐	09	View Blocking in Treatment

B Dogs

ACHIEVED		
☐	10	Outdoor Exam and Treatment
☐	11	Fear Free Scale (Direct Approach, Recessed)
☐	12	Non-Slip Flooring
☐	13	Considerate Approach and Gentle Control
☐	14	Floor Exam Option
☐	15	Floor Treatment Option
☐	16	Fear Free Grooming Tub
☐	17	Use of Fear Free Color Palette
☐	18	Eliminate Dogs Facing Dogs in Wards

C Cats

ACHIEVED		
☐	19	Platform for Cat Carriers in Waiting and Exam
☐	20	Outdoor Exam and Treatment
☐	21	Outdoor Views from Exam Rooms
☐	22	Enrichments/Climbing Structures in Exam Rooms
☐	23	Considerate Approach and Gentle Control
☐	24	Grooming/Bathing in a Feline-Only Area
☐	25	Eliminate Cats Facing Cats in Wards
☐	26	Use of Fear Free Color Palette
☐	27	Eliminate Images of Other Cats from View

D Housing

ACHIEVED		
☐	28	Cat Housing Away from Dog Housing
☐	29	Provide More than One Dog Ward
☐	30	Provide Quiet Latches and Quiet Hinges on All Cages
☐	31	Non-Reflective Surfaces in Cages
☐	32A	Horizontal Bars or Glass on Cage Doors
☐	32B	Dog Runs with Clear View at Dog Eye Level
☐	33	Resting Platforms for Cats and/or a Place to Hide
☐	34	Cages with Views Outside Room
☐	35A	Maintain Critical F-F Dimensions in Caging for Cats
☐	35B	Maintain Critical F-F Dimensions in Caging for Dogs
☐	36	Cageless Housing for Cats
☐	37	CCU Visiting

E Lighting + Sound

ACHIEVED		
☐	38	Daylighting in Animal Wards, Treatment, Exam Spaces
☐	39	Dimmable Lighting in Wards and Exam Rooms
☐	40	Full-Spectrum Lighting in Animal Occupied Areas
☐	41	Sound Walls between Wards and Treatment
☐	42	Sound Walls/Buffer between Exam and Treatment
☐	43	Prevention of Noise and Vibration
☐	44	Minimum NRC of .65 for Ceiling Materials
☐	45	Species-Specific Music in Each Room
☐	46	Non-Audible Hospital Paging and Alert Systems
☐	47	Sound Enclosures around Exam Rooms

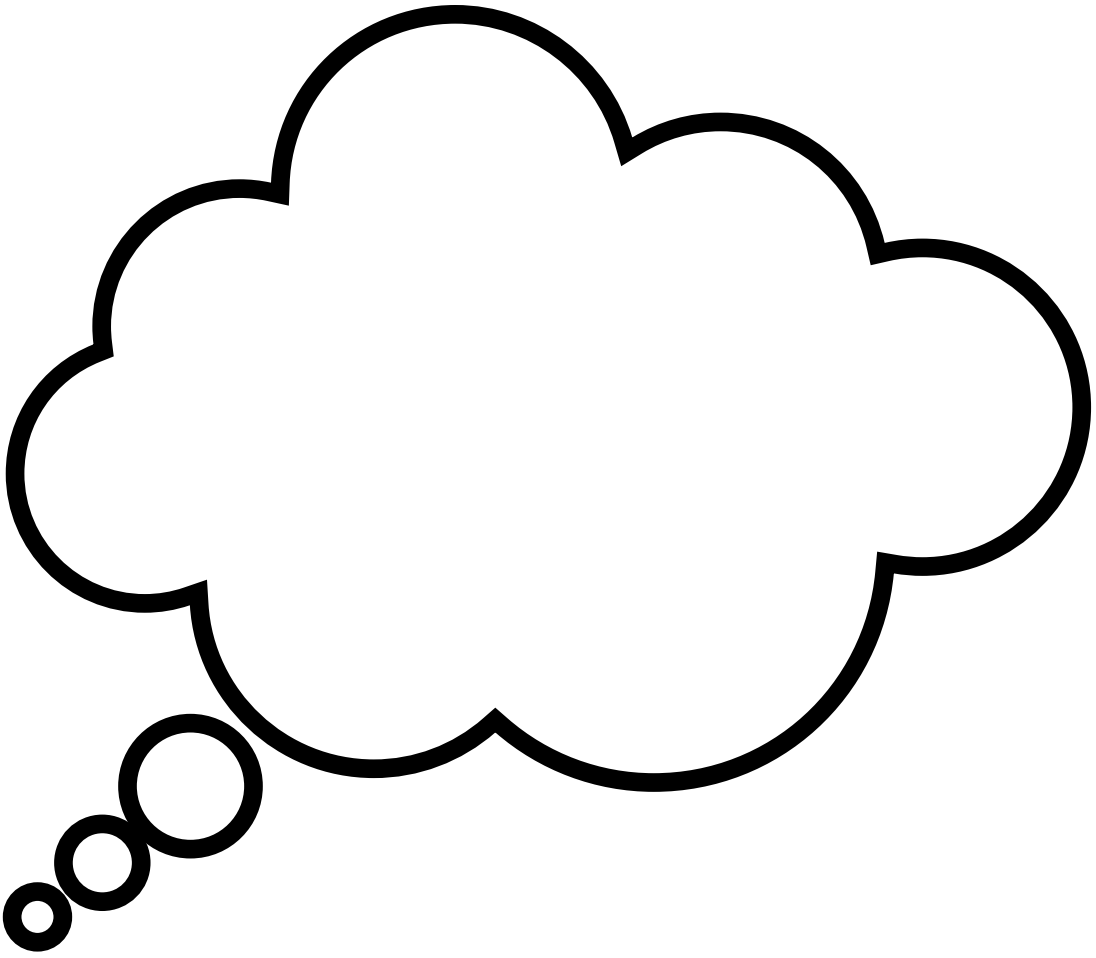
F Mechanical

ACHIEVED		
☐	48	Separate Dog and Cat Area Air Exchange
☐	49	Negatively Pressurize Ward Spaces
☐	50	Achieve Minimum Air Exchanges for Wards
☐	51	One-Hundred Percent Exhaust in Wards
☐	52	Pheromone Dispensers in Each Room
☐	53	Ventilated Animal Caging
☐	54	Radiant Heating of Patient Surfaces


FEAR FREE
Taking the pet out of petrified.

A:

Fear Free PLANS



Fear Free Plans

Background

In 2009, Penn State's Hershey Medical Center opened a "no waiting room" Emergency Department that was designed to be patient friendly and efficient. In the new model, patients are checked in, triaged, and sent immediately to the proper departments. By providing human resources to handle the influx of patients on the front end of the visit, the hospital saved $13 million in capital construction costs and reduced patient length of stay by half.

Fear Free veterinary hospital design can be inspired by "no waiting room" concepts. Waiting is not only inefficient, it is hard on pets. A tremendous amount of fear is generated in the waiting room. Reducing wait times and eliminating the traditional waiting room is a cornerstone of Fear Free hospital design.

The Fear Free hospital visit starts at home. While the operational protocols of preparing for a Fear Free visit are covered elsewhere, this design guideline acknowledges that the success of the hospital design depends on the relationship between the practice, the client, and the pet. In this scenario, the hospital and the client will have prepared for the visit beforehand.

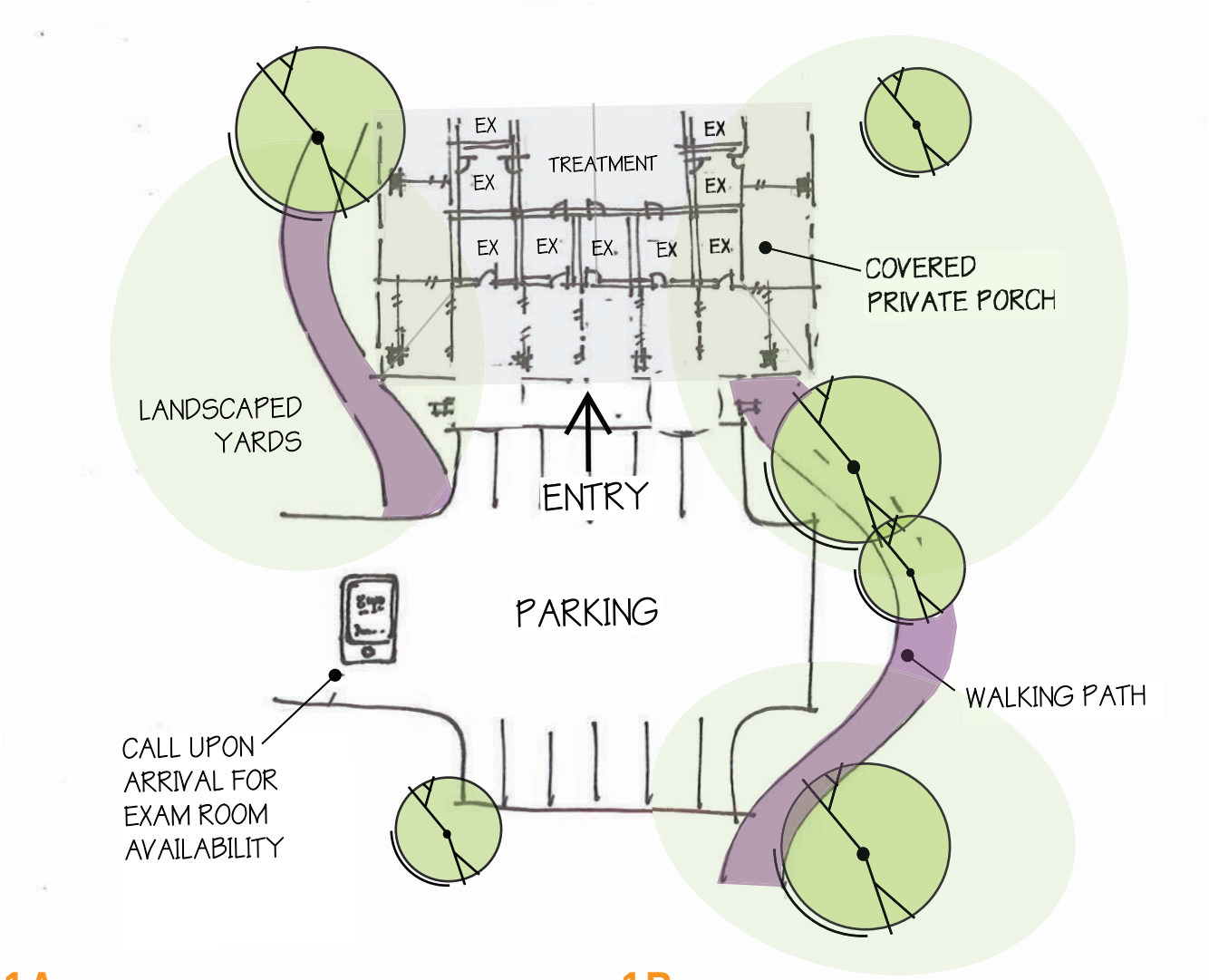
To eliminate the fear that pets experience when initially entering the hospital, the Fear Free hospital offers alternative means of check in including:

- The client sends a text message or calls from the parking lot. The hospital then directs the client to the correct outside entrance.
- A greeter comes to the car.
- The client physically enters the hospital, leaving the pet in the car. In this model, a covered parking area is recommended for the safety of the pet.

In a Fear Free hospital, square footage formerly used for waiting can be allocated to examination in order to move pets more quickly into the controlled environment of the exam room. If total elimination of waiting is not feasible, the hospital can develop reasonable alternatives to indoor waiting such as waiting in the car or on comfortable outdoor porches, weather permitting.

Note to Design Professionals

There may be some instances where a "no waiting room" model is not technically feasible, such as in dense urban environments. In these cases, some credits can be achieved through the careful design of species-specific waiting areas.



1A Eliminate the Waiting Room

Eliminating the waiting room must be tied to other decisions such as:

- Optimizing patient flow.
- Allocating additional resources to client check in.
- Providing an adequate number of exam rooms.
- Developing safe alternatives to interior waiting.

1B Non-Audible Paging Systems – Tied to Outdoor Waiting Areas

Because noises such as buzzers and doorbells can elicit fear and anxiety in pets, non-audible paging systems should be used to notify staff of a client's arrival, or of exam room availability. Clients waiting for exam rooms can be notified via light-up message boards, text messages, or can be provided with restaurant-style vibrating pagers.

If the non-audible paging system is not built into the hospital design, a description of the system to be used is required for credit for this optional standard.

BELOW This exam room permits patients and their pets to enter and exit through an exterior door.
Left Hand Animal Hospital - Niwot, CO

1C Enter Directly into Exam Rooms from the Outside

One way for a client to enter with a fearful dog or cat is through exterior doors directly into exam rooms. At least two exam rooms must have outdoor access in order to achieve this credit. Use these rules of thumb for designing safe outdoor access exam rooms:

- Exterior access exam rooms for dogs must be surrounded by a secondary fenced enclosure to prevent accidental escapes.
- Exterior access feline exam rooms must be entered through fully-enclosed porches for the same reason.
- Locate exterior access exam rooms on the south and east sides of the building or otherwise shield them from afternoon sun and winter winds.
- Depending on the layout and location of the building, it may not be feasible to provide exterior access exam rooms for all patients. Prioritize the use of these rooms for the patients that need them the most.

2 Exterior Covered Greeting Area

A covered exterior greeting area provides a place for the pet to receive positive reinforcement before entering the Fear Free hospital. The greeting area must meet the following four requirements for credit:

- The covered area may be attached to the hospital or freestanding.
- The covered greeting area is placed between the parking areas and the front door.
- A treat dispenser is provided in this space for food rewards.
- The covered greeting area should be highly cleanable to reduce the buildup of pet odors.

While not required for credit, the greeting space can be surrounded by raised gardens to create a pleasant arrival to the hospital.

3 Outdoor Covered Unloading

An outdoor covered unloading area provides a safe place for the client to leave the car to check in, or to more comfortably unload an ill, injured, or fearful pet. This space can be designed like a hotel porte cochere (covered drive) or like a pull-through garage.

ABOVE A pull-through garage for unloading pets.
Veterinary Village - Lomira, WI

BELOW A comfortable waiting porch.
Veterinary Clinic of Myrtle Beach - Myrtle Beach, SC

4 Outdoor Covered Waiting

In favorable climates, exterior porches can provide a comfortable alternative for waiting with a pet. For reasons of comfort and functionality, the porch should be at least seven feet wide. Porches that face south will be useful at most times of the year in a variety of Northern Hemisphere locations.

Lobby and Waiting

In cases where full elimination of waiting is not possible, Criteria 5 and 6 guide the development of Fear Free lobbies and indoor waiting areas. Note that even in the "no waiting room" model, a modest lobby is usually required for purposes of checking in or client prescription pick up, or for accessing some of the exam rooms.

ABOVE A separate cat waiting area with cat carrier resting cubbies.
Pablo River Veterinary - Jacksonville, FL

5 Entry Vestibule

An entry vestibule provides a place for a pet owner to step inside the building without entering the lobby. A treat dispenser should be provided in the vestibule. Place glass at the clients' eye level so they may avoid other animals that might be present in the reception area. A vestibule must be no less than seven feet in depth.

6 Separate Lobbies for Dogs and Cats

Separating pets by species is required to reduce fear and anxiety in indoor lobbies. The lobby desk may span the divider between the dog and cat lobbies in order to allow the hospital to share reception staff.

The dog lobby should be designed so the dog approaches the face of the desk upon arrival (Yin). This allows the dog to get his bearings before interacting with human staff.

ABOVE An example of of a glass sliding doorway to separate dog and cat lobbies.
Loyal Companions - St. Charles, IL

Separation of Species throughout the Hospital

One of the biggest stressors is for cats to interact with dogs and vice versa in a hospital setting. Separation of species is an important concept within Fear Free design, and can be applied to every area of the hospital. This guide focuses on the separation of dogs and cats, but hospitals seeing a large number of birds and/or exotics should also develop separate areas for housing and treating these pets.

LEFT An outdoor aviary.
All Pets Animal Hospital - Katy, TX

BELOW A relaxed cat in a feline treatment area.
Loyal Companions - St. Charles, IL

7 Separate Treatment Areas for Dogs and Cats

Separate treatment areas are defined as spaces that are physically separated to noise, ventilation, and visual barriers so that dogs cannot hear, smell, or see cats and vice versa. Within a species-separated hospital treatment zone, it is acceptable to provide glass above dog and cat eye level between the separated treatment areas to allow the hospital to remain visually connected for doctors and staff. Cats will be much more relaxed if completely separated from dogs within the hospital.

FEAR FREE
Taking the pet out of petrified.
®

BELOW A dedicated cat ward will make feline patients much more relaxed.
Loyal Companions - St. Charles, IL

8 Separate Wards for Dogs and Cats

Just like separate treatment areas, separate ward areas are defined as spaces that are physically separated with noise, ventilation, and visual barriers so that dogs cannot hear, smell, and see cats and vice versa. Because dogs routinely make noise in wards, dog wards and cat wards should not share a common wall, and there should be at least two doors between housed dogs and cats to prevent sound leakage when one door is opened.

BELOW In this glassed ward, the doctor can keep an eye on the patients, while the patients cannot easily see procedure being performed. *PetCare Veterinary Hospital - Santa Rosa, CA*

9 View Blocking in Treatment

In a Fear Free treatment area, animals should not be able to watch treatments performed on other animals. Visual blocking can be achieved using these methods:

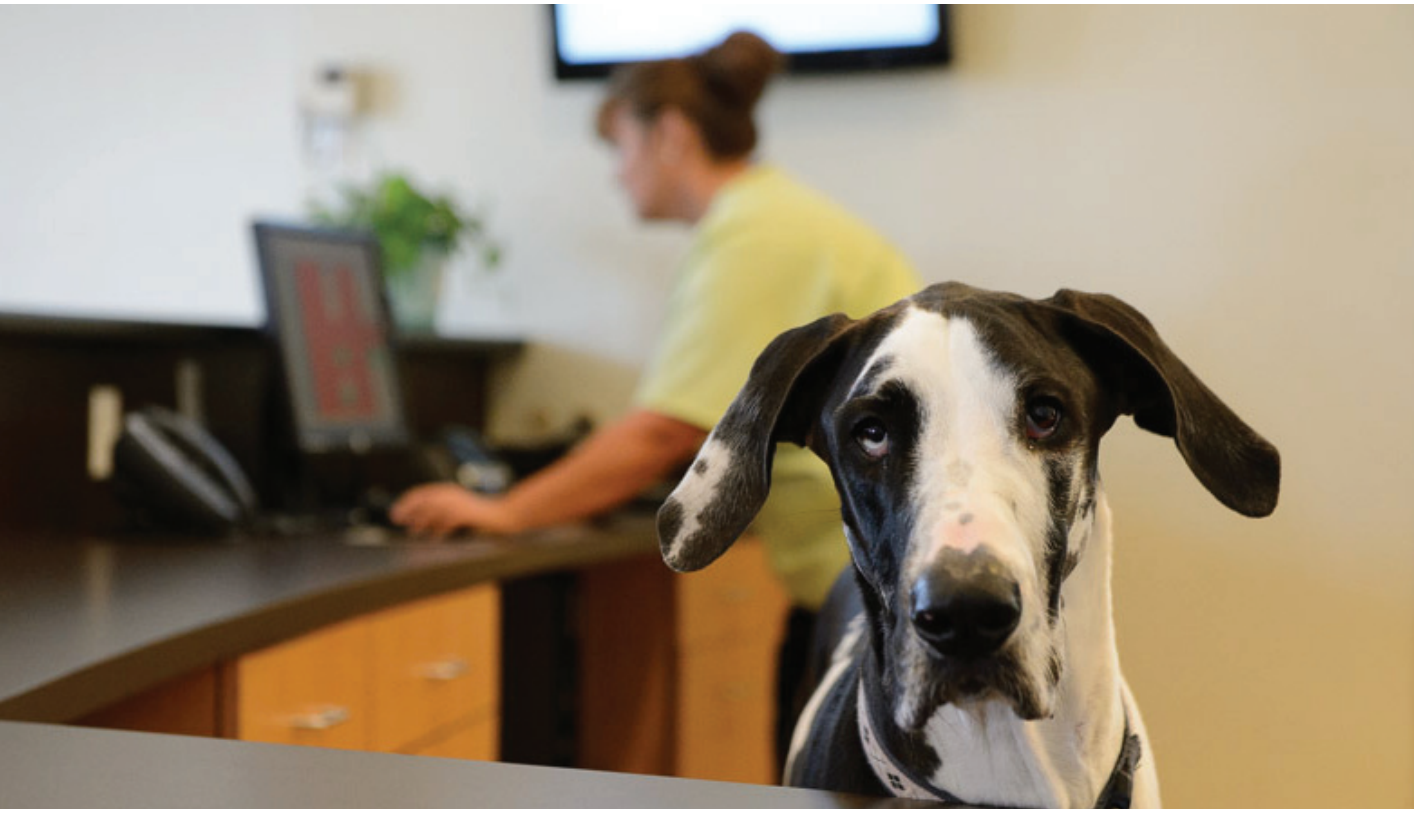
- Animals are housed outside of the treatment room, leaving the treatment room free of cages and runs. If animals must be visible from treatment, they should be housed in separated glassed wards that allow staff and doctors to look in without the animals being able to watch procedures.
- It is acceptable to have animals in a staff work zone only when they are critically ill, as in ICU or CCU wards, or in surgical recovery areas where staff must have immediate access to animals for reasons of protecting the life and safety of the pet.

In treatment areas, where more than one treatment on the same species is occurring, use visual blocking techniques as follows:

- Curtain track between work tables similar to a human emergency department.
- Half-height walls that allow staff to look over without animals seeing each other. This method may be preferred by many hospitals as it allows staff to remain in visual contact with one another.
- In large hospitals, consider dividing treatment rooms into smaller groups of workstations to cut down on the anxiety that large, cacophonous spaces generate.

B:

Fear Free DESIGN FOR DOGS



Dogs readily communicate their distress through barking, shaking, whimpering, hiding, and other visible behaviors. But these signals do not tell the whole story. When frightened, some dogs will “shut down” behaviorally, and this can be mistaken for acceptance.

In designing hospitals for dogs, we strive to minimize ALL types of fear reactions, both internalized and outwardly displayed. For example, rather than focusing on the control of barking noise, the criteria seek to prevent the stressors that cause dogs to bark.

For dogs, much of the success of a design comes down to choice. Choices for the practice to examine, treat, and house dogs in different ways depending on their needs, and choices for the dog to control his position, body, and some aspects of the environment. This sets the stage for a Fear Free visit for each and every unique dog.

ABOVE An outdoor exam space.
Adobe Animal Hospital - Petaluma, CA

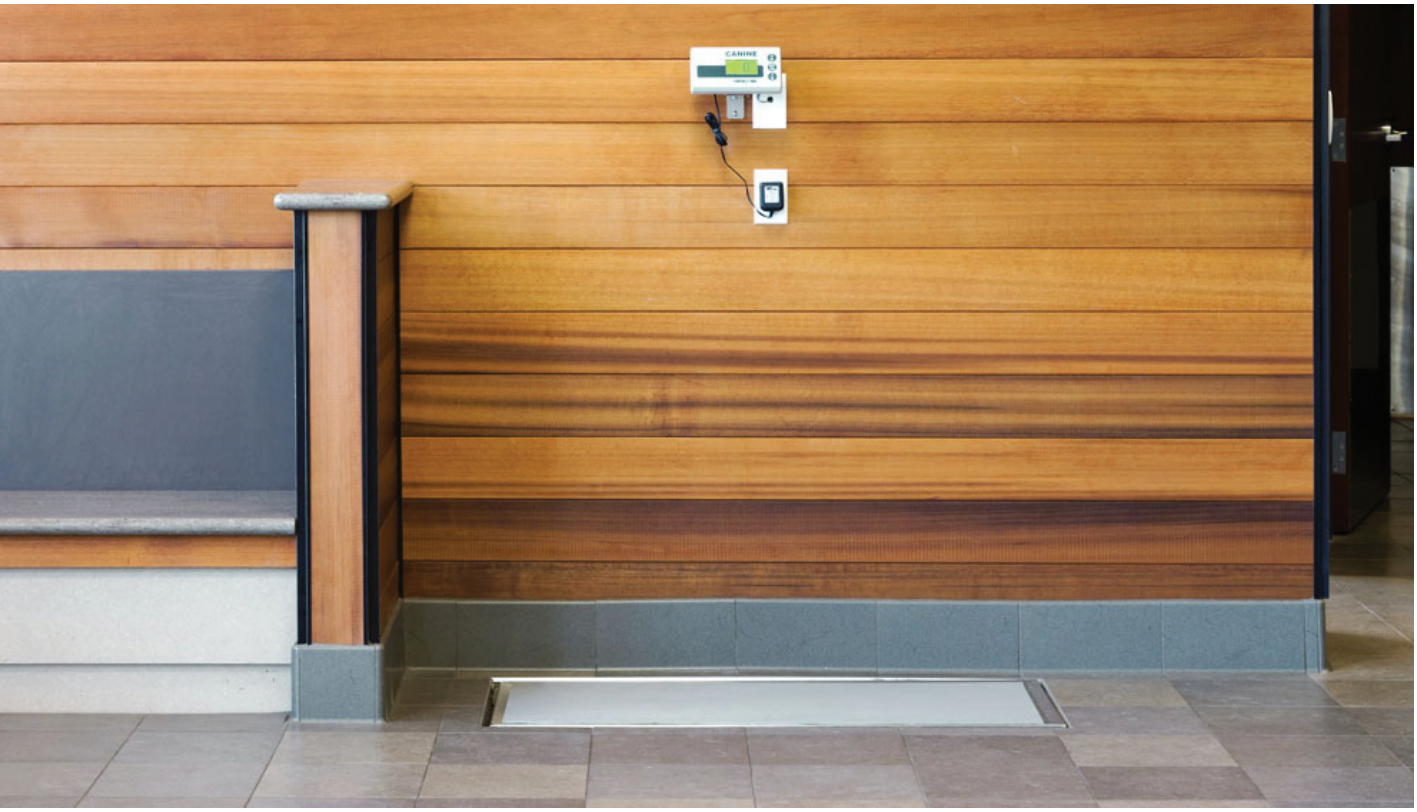
10 Outdoor Exam and Treatment

An outdoor exam and treatment option is a great tool for some dogs that are terrified in hospital settings. The dog can come directly into the outdoor exam room or treatment area from the parking lot. Outdoor treatment areas must be at least partially covered for comfort and all weather use, cleanable, and fully enclosed with non-climbable fencing for safety. Gates on outdoor treatment and exam areas must employ safety latches similar to the ones used around pool enclosures.

As an additional enhancement, the hospital can consider developing an outdoor euthanasia garden. Outdoor euthanasia gardens can be more calming and gentle for pets. Euthanasia gardens can include living plants or tranquil fountains.

To achieve credit for this criterion, hospitals must provide at least one outdoor area that can be used as exam and treatment space. Outdoor euthanasia gardens must be physically separated from this primary outdoor space.

BELOW This recessed scale is more easily used than a typical scale. To take the next step, a Fear Free scale s pulled away from the wall and covered with a a mat.
PetCare Veterinary Hospital - Santa Rosa, CA



11 Fear Free Scale (Direct Approach, Recessed)

Getting on and off of a scale can be difficult and scary for a dog, particularly if getting on the scale requires being directed into a small enclosure. Veterinarians who handle livestock and horses understand that the safest and least stressful way to lead a fearful large animal onto a scale is via a direct approach, where the scale is recessed into the floor and is covered with a mat that makes the scale look safer and more like a regular section of flooring.

A Fear Free scale offers the same option in the small animal setting. The scale is recessed into the floor and covered with a rubber mat. A remote signal sends the pet's weight to a computer at the front desk, allowing for a quicker stop at the scale.

12 Non-Slip Flooring

Reducing the possibility of slips, trips, and falls (STFs) has become a hot topic within the human healthcare industry. According to the U.S. Bureau of Labor Statistics (2009), STF injuries are 90 percent greater in hospital settings than the average rate in all other private industries combined. If hospitals are hazardous for workers, they're also hazardous for human patients. "Among older adults, falls are the leading cause of both fatal and non-fatal injuries" (Centers for Disease Control and Prevention).

Fortunately, the pressure to make human hospitals safer has created new medical flooring options that can also be used in Fear Free veterinary hospitals. The fear and also the real possibility of slipping and losing footing is a common problem for canine patients but it is one that we can avoid.

"Non-Slip Flooring"credit can be achieved by installing non-slip flooring in at least two of these four areas:

- Client areas - lobbies and exam rooms.
- Treatment areas.
- Wards.

Non-slip flooring is defined as flooring that provides a coefficient of friction (COF) of at least 0.60 when wet, according to ASTM D2047. Designers can readily obtain COF data from product manufacturers. In addition to achieving this standard, the floor must look solid to the dog, and must not have a high gloss or polished surface, as this may create the psychological impression that the floor is slippery. The following flooring surfaces qualify:

- Safety sheet vinyl floors. Many of these have COFs of 0.80 or greater when wet. New safety floors are easier to clean than their older counterparts, and do not need to have a "sparkly" appearance. With proper installation, some safety sheet vinyl products may even be used in wet areas of buildings, and therefore may be used throughout a hospital.
- Safety vinyl tile. This inexpensive product is not acceptable for wet areas or areas requiring high sanitation.
- Rubber tile and sheet flooring. Rubber products don't typically seal well around drains so they are often limited to the dry areas of hospitals, but otherwise rubber flooring can be an excellent choice. Rubber flooring also helps to reduce acoustical reverberation within a space.
- Some porcelain tiles. Tile has to be selected very carefully to balance cleanability with slip resistance, particularly when the tile is wet. Epoxy or urethane grouts should be used to create a sanitary finished surface.
- Some resinous flooring. The problem with resinous flooring (epoxy, etc.) is that in order to achieve the proper wet COF, the floor can be difficult to clean. It is helpful to work directly with the flooring manufacturer to find the best balance between cleaning protocols and safety.

Tip for Design Professionals

Other sanitary flooring products meeting a wet COF of at least 0.60 may be used as long as they meet the criteria described above.

ABOVE An ottoman being used as an exam tablee for a dog at *Loyal Companions - St. Charles, IL*

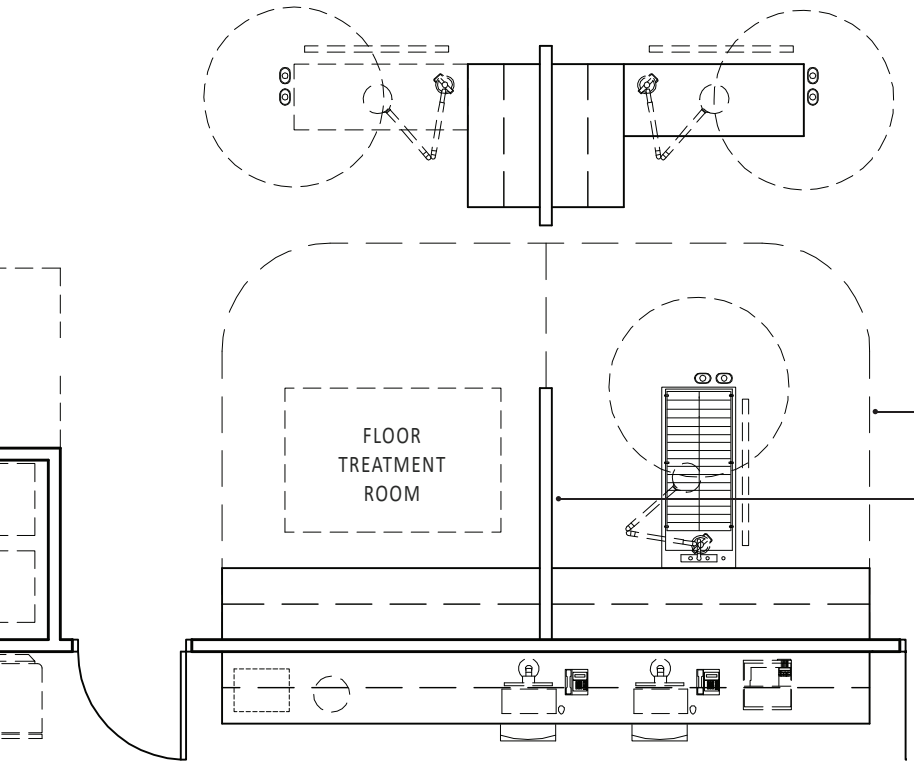
13 Design Options for Considerate Approach and Gentle Control

Design can assist veterinarians and technicians to provide a considerate approach and gentle control through a variety of means, including by providing alternate options in exam rooms. One approach is to use a low, accessible, and comfortable furniture piece, such as an ottoman to perform examinations.

LEFT Floor exam room.
Veterinary Village - Lomira, WI

14 Floor Exam Option

Another option for fearful or very large dogs, is to provide the means to exam a dog on the floor. Provide a soft, cleanable surface for the dog to lie on and enough floor space for the doctor and technicians to attend to the dog.



15 Floor Treatment Option

Just as a floor exam option is important, so is a floor treatment option for large dogs or dogs that are more comfortable on the floor. To the left is an example of a design that features a dedicated floor treatment space with visual blocks to other treatment stations.

16 Fear Free Grooming Tub

Lifting a dog into a grooming tub is frightening for the dog and potentially unsafe for staff. While a grooming tub with stairs or a ramp is a good, industry standard option, consider providing a lower tub or shower for larger dogs so that they may step right in.

17 Use of Fear Free Color Palette

Urban myth says that dogs are colorblind. In fact, dogs have dichromatic vision and can see most of the colors humans can see, but they lack the ability to distinguish colors between red to orange, in the 510 to 590 nm range.

The other distinguishing features of canine vision include:

- Dogs see much better in low light than humans can.
- Dogs see into the ultraviolet UVB spectrum.

The last point is very interesting, because it means that some materials will appear to fluoresce to dogs, including organic material such as urine that contains phosphorous, as well as bright white manmade materials such as paper, plastic, and white fabrics. Non-colored plastics may also fluoresce.

Very little information is known about what dogs prefer in terms of color, but in one study dogs preferred blue chew toys over other colors (Wong). Blue is also a favorite color for humans in western culture, so humans may respond positively to blue hues, which may in turn influence dogs.

Because dogs can see well in low light, it is best not to use dark colors in enclosures where dogs stay overnight so that they can more easily see and comprehend their surroundings. Finally, because bright white plastics and fabrics are more visually jarring to dogs than they are to us based on their tendency to fluoresce in the UV spectrums, they should be avoided.

Founded on the information that we have available to us regarding the vision and color preferences of dogs, the Fear Free movement has developed a Fear Free color palette that was selected to be positive and visually comfortable. Variations in hue are acceptable to allow for changing fashion, culture, and style, but generally the color palette should employ colors in the soft yellow to violet range, avoiding oranges and reds. For simplicity, the same palette is used for cats. More discussion of cats' visual acuity is included in the guidelines for felines below.

ABOVE A single-sided dog ward.
The PARC Vet - Fort Worth, TX

18 Eliminate Dogs Facing Dogs in Wards

Dogs do poorly when facing each other at a close distance in runs, and they benefit from not being housed in this way. In order to achieve this credit, wards using traditional dog run housing must be designed so that dogs do not face each other across an aisle.

C:

Fear Free DESIGN FOR CATS

Cats are magnets for fear and stress in veterinary settings. Known feline stressors include confinement, transport, changes in environmental temperature and/or ventilation, light patterns, unfamiliar smells, noises, dogs, other cats, irregular schedules, unpredictable handling, presence of unfamiliar human contact, inability to engage in natural feline behaviors, and lack of control over the environment. Most of these circumstances occur in a typical visit to the veterinarian's office!

Unlike the stress behaviors that dogs demonstrate, stress in cats can be more difficult to see. Stressed cats become withdrawn, and it is easier to overlook their discomfort. That's why it is essential to create medical environments that are designed with cats' well-being in mind.

19 Platform for Cat Carriers in Waiting and Exam Rooms

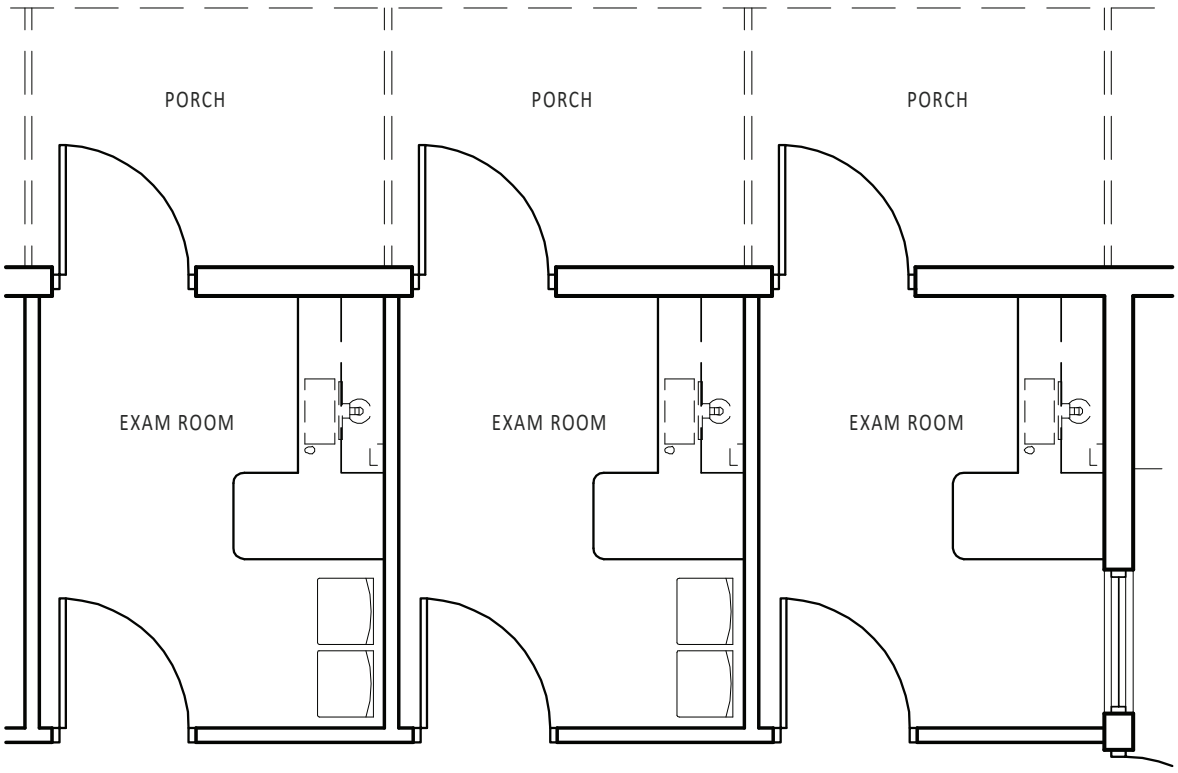
For cats, being set on the floor can lead to a sense of vulnerability. Cats brought into the hospital in carriers should have a towel set over the carrier and should be set off the floor on a raised, stable surface. The feline waiting and exam rooms should be designed with convenient platforms for cat carriers.

20 Outdoor Exam and Treatment

In an animal shelter setting, cats are healthier and less stressed when allowed to have the choice to be in safely enclosed outdoor environments. “Cats benefit from the choice of exposure to sunlight and fresh air” (Wagner).

Outdoor environments are free from the noises of the insides of a building and free from mechanically transmitted odors as well, allowing cats to use their highly tuned senses to process positive natural stimuli instead of artificial, potentially negative stimuli.

Indoor/outdoor porches can be used in Fear Free feline treatment and exam areas to provide an option to work with a cat in a more natural environment. Porches should be located on the south and east sides of the building where possible, and separated from traffic, dogs, and noisy outdoor spaces. Porches should be designed to be cleanable and disinfectable.



Operational Notes

Outdoor spaces should not be used for cats that have no access or experience with enclosed porches in their homes, as these spaces may be foreign and uncomfortable to cats that live entirely indoors. If using an indoor/outdoor porch, keep in mind that cats' natural thermoneutral zone is between 85 and 100 degrees F ("Nutrient Requirements of Dogs and Cats") and therefore they will not be comfortable in outdoor spaces on cold days.

ABOVE A window seat for cats.
Morningside Animal Hospital - Port St. Lucie, FL

21 Outdoor Views from Exam Rooms

When possible, feline exam rooms should have views to the outside to allow for more pleasant, natural sights as well as the wavelengths of light that cats appreciate and can comprehend.

For credit, at least one feline exam room must be designed with an outdoor view.

Tip for Design Professionals

Design low, deep window seats in feline exam rooms so that cats can enjoy the outside views.

22 Enrichments/Climbing Structures in Exam Rooms

Place a feline climbing structure in the exam room to allow the cat a choice of vantage points when initially exploring the exam room. The structure should be low enough so that the cat can be retrieved, with enough distance from the ceiling to ensure cats don't escape into the ceiling space or onto the tops of cabinets.

Materials for climbing structures should be cleanable and disinfectable.

23 Considerate Approach and Gentle Control

Cats can benefit from alternative methods of providing exams. Exam boxes, for example, allow cats to "hide" while giving access to the veterinarian to preform an examination.

24 Grooming/Bathing in a Feline-Only Area

Most cats do not enjoy bathing, but the process can be far less stressful if performed in a feline only area, away from dogs and from the sight of other cats. A deep sink can be used in lieu of a bathing tub.

ABOVE In the photo above, a cat is being examined in an accessible hiding box attached to the wall of the exam room. - *Loyal Companions, St. Charles, IL*

25 Eliminate Cats Facing Cats in Wards

Cats object to facing one another at close proximity. Design wards so that cats do not face each other. This may require incorporating more wards with fewer cats rather than a single large ward with many cats.

Operational Note

For cats that are housed for longer periods of time, it is better for them to have some views of other cats in the same space, as long as the cats are separated by a generous distance and the housed cats have the choice to be visible or not visible. In other words, it is less stressful for a cat in long-term housing to have a choice about visually perceiving the presence of other cats rather than to stare at a blank wall (Wagner).

In a hospital setting, since the primary objective is reduction of stimulation and the cats stay for a short time, total visual separation between cats is recommended.

26 Use of Fear Free Color Palette

Feline color perception is different from dogs, but has similar characteristics. Cats are trichromatic but they do not see colors with as much acuity as humans do, and they can discern the blue and violet end of the spectrum better than the red end.

Cats have superior vision in low light conditions and also see into the UVB spectrum. Biologist Ronald Douglas at City University London, in collaboration with Glen Jeffery, a professor of neuroscience at University College London, determined that cats are among the mammals that detect substantial levels of UV (Douglas, Jeffery).

So like dogs, the principles that guide the selection of color include:

- Avoidance of manmade materials that fluoresce, including some bright white plastics, some clear plastics, and white paper.
- Preference of color selection in the spectrum that cats can see best, which is the blue and violet end of the spectrum.
- Choosing lighter colors to allow cats to leverage their superior night vision to comprehend their built environment in low-light conditions.

The Fear Free color palette described in #17 was designed to apply to cats as well as dogs.

27 Eliminate Images of Other Cats from View

While veterinarians have traditionally enjoyed decorating hospitals with photo realistic images of dogs and cats, these images should be avoided in animal housing, treatment, and exam areas. Cats in particular are known to react poorly to other images of cats. Avoid the use of photorealistic images of cats in feline areas of the hospital.

D:

Fear Free HOUSING

BELOW Luxury Dog House by
Dog Mansions-Best Friends Home, designyoutrust.com

Much of the Fear Free checklist focuses on macroenvironmental concepts that reduce fear for dogs and cats. This section introduces the important features of an animal's microenvironment, or housing enclosure. While animals do not typically stay in hospitals for an extended period of time, a well-designed enclosure can reduce fear and promote health.

Tip for Design Professionals

Fully-enclosed environments can be too isolating for some dogs. Providing a variety of environments and levels of stimulation can be helpful in meeting the needs of various dogs.

28 Cat Housing Away from Dog Housing

In addition to housing cats and dogs in separate wards (#8), it is important to house cats such that they cannot hear or smell dogs. Use these rules of thumb:

- Dog housing and cat housing should not share a common wall.
- Separate air flow between cat housing and dog housing.

29 Provide More than One Dog Ward

One of the tools animal behaviorists use to positively influence the experiences that dogs have in housed settings is to separate the dogs based on their level of reactivity and other behavioral needs. By providing more than one dog ward, technicians can separate dogs in such a way as to provide the maximum stress reduction for all of the dogs in care.

Beyond having more than one ward, if possible, create some fully-enclosed rooms for individual dogs. These are effective for reducing the level of fear and reactivity among some dogs, for these reasons:

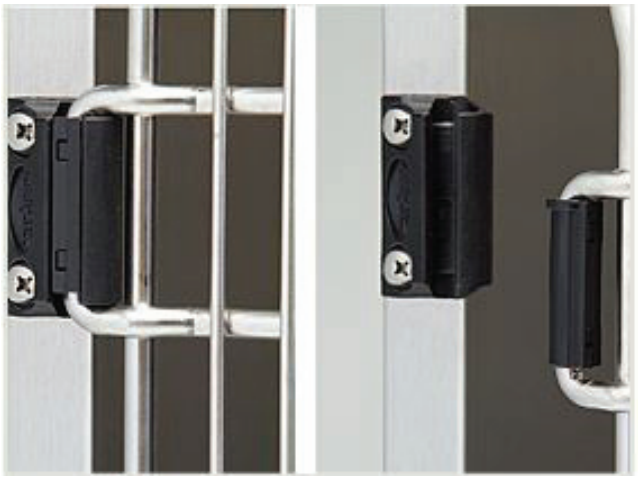
- Dogs have greater sound isolation from one another.
- Dogs have greater air flow isolation from one another.
- Dogs have a greater sense of defensible space.

In the housing area illustrated below, even though these dogs face each other across a hall, fully-enclosed rooms resulted in an 80 percent reduction in post-surgical sedation rates for this veterinary practice, compared to the previous traditionally designed hospital setting.

RIGHT ICU runs and caging.
VCA Vancouver - Vancouver, BC, Canada

30 Provide Quiet Latches and Quiet Hinges on All Cages

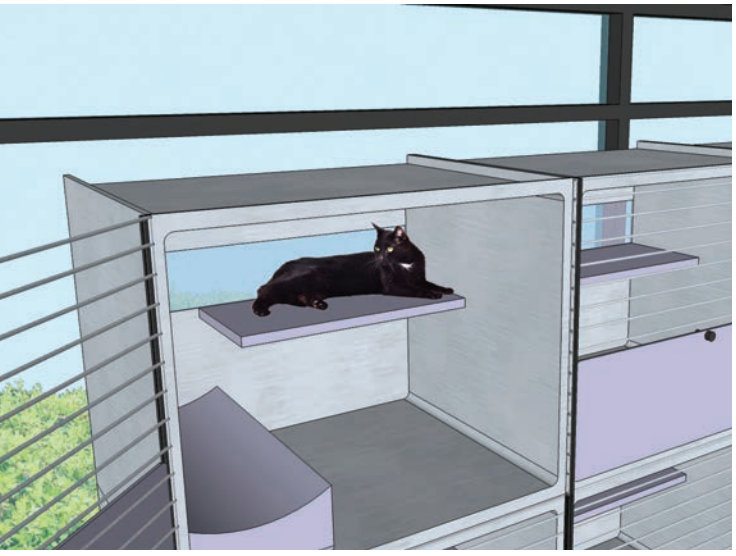
A Fear Free hospital is free from unnecessary and unpleasant noises. The slamming sound that cage doors make when they are closed and the creaking sound they make when they're opened can be avoided with improved products. Most manufacturers carry quiet latches that click shut rather than slamming. Select these latches, along with quiet hinges, if offered by the manufacturer.



ABOVE Plastic-coated stainless steel quiet hinges
SHOR-LINE

31 Non-Reflective Surfaces in Cages

Fear and agitation can be caused by reflective surfaces, especially among cats. Cages complying with Fear Free design guidelines must be manufactured with low-gloss interiors. Based on cats' and dogs' abilities to see into the UV spectrum, some bright white plastics should be avoided. Matte-finish stainless steel, high-pressure laminate, and light colored resin products can all be appropriate choices. Avoid dark colored cage interiors.



ABOVE The Fear Free cage above contains a privacy panel for an option to hide, a large resting shelf (for cats only), a quiet latch and horizontal bars for an option of a full view out of the cage. These features are appropriate for a healthy cat that does not have an urgent medical condition.
Designed by Animal Arts

32A Horizontal Bars or Glass on Cage Doors

Within an animal's enclosure it is important to have both an option for privacy and an option for an unobstructed view out. Traditional vertical cage bars restrict the view for the animal and do not allow the option to see clearly out of their enclosures. Horizontal bars allow animals to see with unobstructed views out of their environments. Fear Free cages employ horizontal barred gates.

In addition to this option for unobstructed views, healthy animals that don't require continuous direct monitoring by staff should also be provided with a privacy option which may be as simple as a towel hung on a portion of the cage gate or a built in privacy panel allowing the animal the choice to hide.

Glass doors are also acceptable for cage fronts as long as they:

- Accommodate ventilation of the cage. Unventilated full-glass cages do not provide enough air exchange to maintain a healthy environment.
- Provide an option for privacy for the animal when medically appropriate.
- Are lit in such a way as to avoid reflections and glare within the cage.

ABOVE These dogs can see out of their enclosures, but solid side walls between dogs prevent dogs from facing each other at close proximity.
Larimer Humane Society - Loveland, CO

32B Dog Runs with Clear View at Dog Eye Level

There is no one solution for housing dogs, as dogs vary tremendously in their psychology and behavior. The recommendations contained in this section are based on case studies, opinions of industry experts, and available research.

Dog wards should be designed so that dogs are not facing other dogs. This is for reasons of health as well as behavior, as dogs have enough lung capacity to transmit airborne diseases across an aisle in a kennel. Given this baseline requirement, most dogs will benefit from seeing out of their enclosures, as it can be stressful for a dog to be in a visually isolated space.

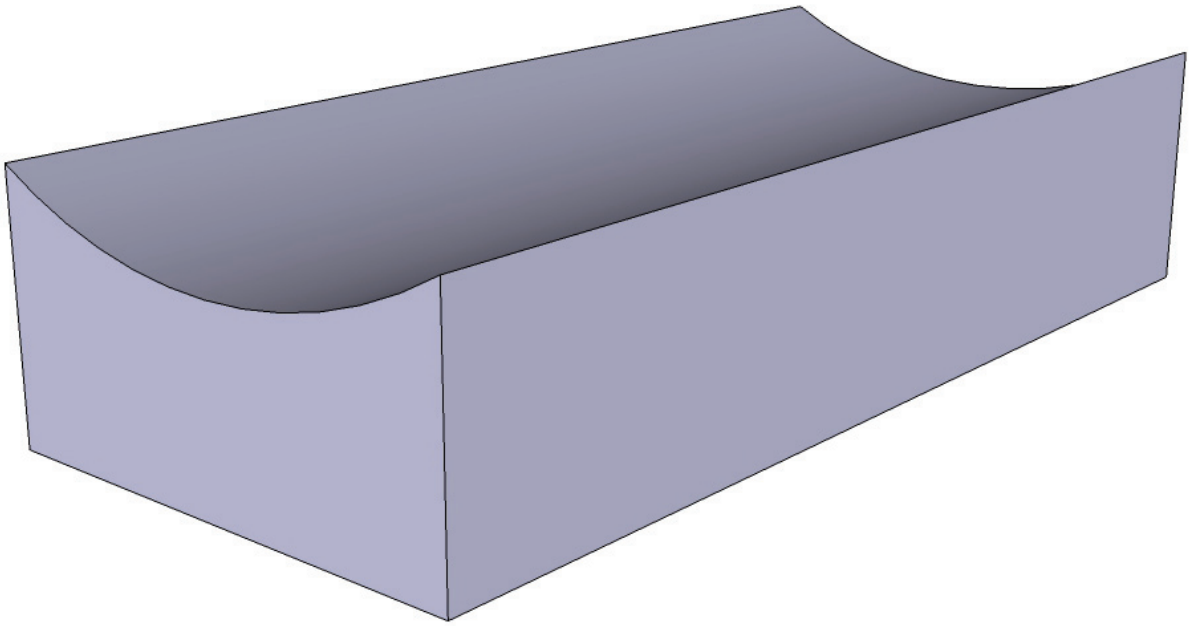
In some situations where reactive dogs are housed for longer periods, placing a temporary barrier over the front of the run can be helpful for reducing fear, anxiety, and frustration (McConnell).

The balance between visual isolation and visual connection is tied to the needs of the particular dog, whether the dog is being housed for long or short periods, and whether a visual barrier is temporary or permanent.

Permanent barriers on the fronts of kennels are not always appropriate because they can encourage some dogs to jump up to see out. This is a detrimental behavior in any setting. Given that dogs in medical settings are housed for short periods, most will benefit from looking out of their enclosures. Based on a balance of the information available, provide the following:

- A design that prevents dogs from looking at other dogs across an aisle.
- The possibility of a clear view out of the dog's enclosure at the dog's eye level.
- The possibility to put up a temporary barrier for the extremely fearful or anxious dog. (Note that dogs with critical medical conditions should remain fully visible.) A simple sheet or towel hung on a run door will work, or the practice can purchase a manufactured product that serves the same purpose. Barriers should not be part of the permanent design of the kennel door.
- Greater privacy on other portions of the run to give the dog a sense of enclosure. For example, it has been established by the vast majority of experts that isolation panels between runs are required.
- If glass is used, the room must be ventilated through the enclosure for proper air flow.

BELOW This concave resting platform can be placed in a cage to give a cat a sense of defensible space. The resting platform comes in a variety of Fear Free colors. *Designed by Animal Arts*



33 Provide Fear Free Resting Platforms and/or a place to hide in Cages for Cats

Enriching an enclosure for a cat in a medical setting is a difficult task. That said, some degree of enrichment is important to provide housed animals with a sense of control, which allows them to better cope with stress (Newberry 229-243).

When medically appropriate, provide a Fear Free resting platform in each cat cage. This accessory should have a comfortable, concave shape, providing the cat with a defensible space within the cage. The concave shape allows it to be cleaned easily.

In lieu of, or in addition to the resting platform, cats can be provided with a hiding place in caging. This can be provided with a curtain that can be drawn, or a moveable panel.

Providing a resting platform and/or a place for cats to hide is a mandatory standard for cats except when medically contraindicated.

34 Cages with Views Outside Room

Fear Free hospitals should incorporate views out of cat wards into pleasant outdoor spaces or neutral indoor spaces such as utility or office areas where staff are performing routine tasks.

Views out of dog wards into pleasant or neutral spaces can also be helpful to dogs in order to reduce their sense of visual isolation.

These views should not include views of other animal spaces or work stations where animals are being treated.

ABOVE *Olde Towne Pet Resort-Dulles - Sterling, VA*
BELOW This dog can see out of his enclosure, which may reduce anxiety in a medical setting.
Belacoop Animal Hospital of North Park - Gibsonia, PA

ABOVE In this Fear Free cat cage, a vertical sliding privacy panel allows the option to screen the top or bottom of the cage, or no screen if the cat requires continuous monitoring.
Designed by Animal Arts

35A Maintain Critical Fear Free Dimensions in Caging for Cats

Many cats have traditionally been housed in small enclosures that do not allow them to express normal behaviors and assume normal postures. In contrast, Fear Free feline housing prioritizes a cat's ability to move normally in both a horizontal and vertical plane, which has been shown to improve well-being among housed cats "Guide for the Care and Use of Laboratory Animals".

The Association of Shelter Veterinarians Guideline for the Standards of Care in Animal Housing Facilities sets forth the accepted square footage benchmarks for cats in care in longer term housing. These guidelines require a minimum of 9.5 - 11 square-feet for an individually housed cat, which is a four or five-foot long cage. The square-foot threshold is partially derived from an essential separation distance of at least three feet between food and litter. Fear Free caging should be equipped with a litter box designed for ill or compromised cats.

Fear Free feline housing seeks a balance between the guidelines for long-term housing and the minimum dimensions of horizontal and vertical space. Fear Free feline housing must meet the following dimensional requirements:

- Cages are designed so that cats are not set at floor level. The bottom of the first cage is a minimum of one foot off the floor.
- Cages should be at least 30-inches tall for adult cats.
- Cages should be 36-inches wide for healthy adult cats. This allows for enrichments such as shelves and Fear Free resting platforms.
- Cage units should be no more than two units tall so that staff can readily see the cats and remove them from cages without reaching over their heads.

Exceptions to the required Fear Free dimensions are made for medical situations, such as surgery recovery, where restriction of movement is necessary. Exceptions are also made for housing kittens, as they are physically smaller than adult cats.

35B Maintain Critical Fear Free Dimensions in Caging for Dogs

Because dogs vary so much in size, the rules of thumb require discretion and interpretation from the hospital management team and the design professional.

Like cats, healthy adult dogs must be able to move freely and express normal behaviors and assume normal postures within their enclosures to meet basic animal welfare standards. The only exception that applies is a necessary restriction of movement for medical reasons. Thus, if a healthy dog is too large to physically turn around in a cage without touching the walls of the cage, he should be housed in a run.

Dog cages may be placed closer to the floor than cat cages, and so typical cage bases may be used. Generally the individual cage units should not be less than 30-inches tall to allow a dog room for normal posture. It is typically beneficial to design lower cages to be 36-inches tall.

Runs in medical settings should be wide and shallow rather than deep and narrow. Deep and narrow runs promote poor behaviors and make the relationship between the dog and the caretaker more difficult. Wide and shallow runs encourage natural interactions between the dog and the caretaker, give the dog more room to maneuver, and are designed better for the size and shape of a dog.

BELOW Dog runs illustrating wide enclosures.
Animal Rescue League of Iowa - Des Moines, IA

Important Note to Veterinarians and Design Professionals

Check your state agriculture laws to determine if any additional local regulations apply to the design of the animal enclosures. While most state agriculture laws will be less restrictive than the guidelines outlined in this document, some state laws such as the PACFA law in Colorado require large enclosures, sized based on the size and species of the animals and the length of stay.

36 Cageless Housing for Cats

Healthy, relaxed cats prefer environments that allow them to explore vertical space. "For cats, dogs, and some rabbits, housing enclosures that allow greater freedom of movement and less restricted vertical space are preferred (e.g., kennels, runs, or pens instead of cages)" ("Guide for the Care and Use of Laboratory Animals" 63). Cage-free options for cat housing include cat runs, shower enclosures outfitted with shelves, and vertical towers.

In order to use cageless feline housing effectively in a medical practice, the cats must be both healthy and relaxed enough to have graduated beyond the need to hide in a small space. Fear Free hospitals incorporating patient boarding are ideal businesses to utilize cageless feline housing.

LEFT Cat runs by Mason Company in an animal shelter setting, the Animal Welfare League of Arlington. These runs are approximately four-feet by five-feet to house more than one cat. Towers housing individual cats can be as small as three-feet by three-feet in footprint.

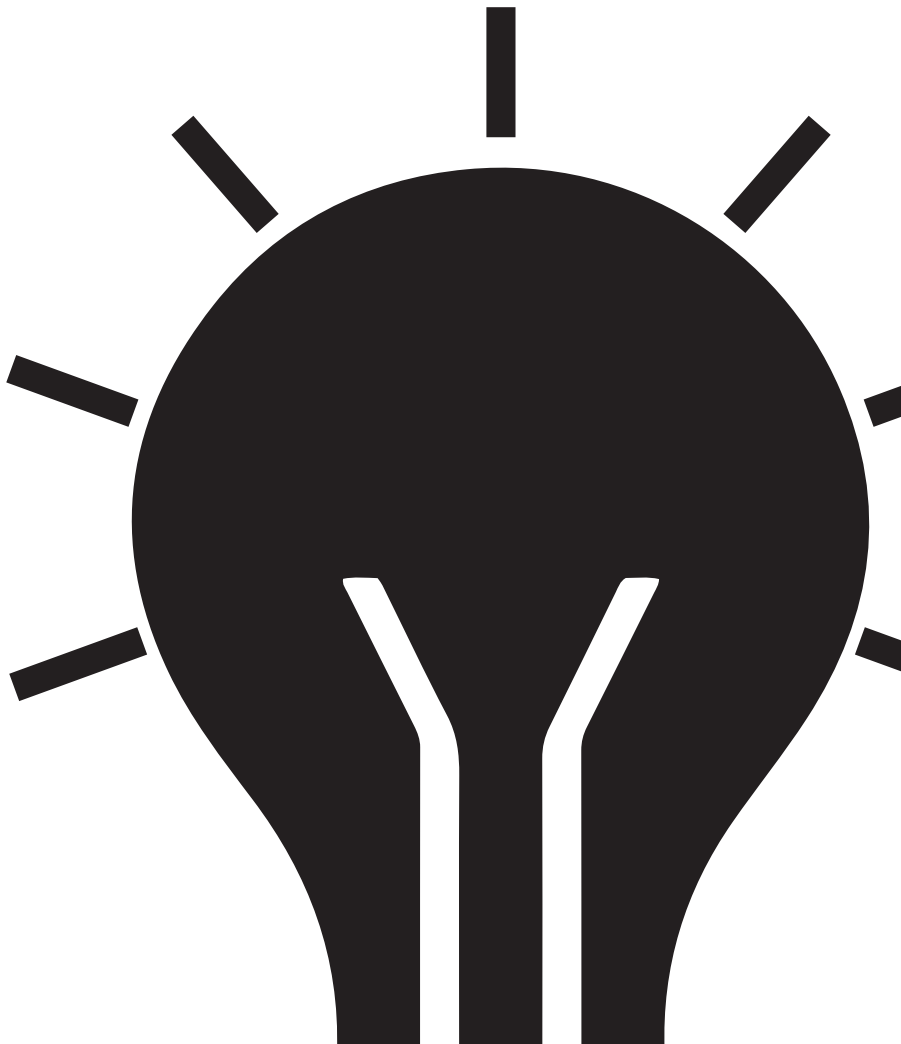
37 CCU Visiting

Seriously ill animals can be comforted by the presence of their human family. Fear Free hospitals actively utilize the relationships between pets and their humans and reinforce the human/animal bond whenever possible. In hospitals providing critical care, designate a quiet place for human clients to visit their hospitalized pets.

BELOW CCU visiting.
Pet Crossing Animal Hospital and Dental Clinic - Bloomington, MN

E:

LIGHTING + SOUND



Animals experience environments differently than humans do. In this section we outline effective methods for designing for a cat's or dog's sense of vision and hearing, with the ultimate goal of creating more nurturing, natural environments for animal patients.

Background on the Role of Daylighting

The benefits of daylighting have been studied in many industries including education, retail, and healthcare. These benefits include:

- Reduced patient recovery time (Hershong 65-67; Choi).
- Improved staff productivity in office environments (Heschong Mahone Group).
- Improved retail sales (Heschong Mahone Group).
- Improved performance in educational settings (Heschong Mahone Group; Oldroyd).

As dogs and cats are physiologically similar to humans, daylighting provides the same healing benefits to animals. This position is supported by the U.S. Green Building Council, as daylighting in animal spaces can be considered for overall occupant benefit under the LEED Checklist credit interpretations.

As if health weren't incentive enough, daylighting can also help building owners save money in lighting costs. Sunlight provides approximately 140 lumens of light for each watt of heat energy produced (EnergyStar.gov), making it the most efficient lighting system available. In addition, typical office lighting systems cost 60 cents per square foot per year in utility costs (Lighting Research Center).

Below are some rules of thumb for incorporating daylight effectively into your Fear Free hospital:

- In moderate climates, develop thinner or open plans, oriented on an east/west axis, that have a greater connection with the out-of-doors.
- In the Northern Hemisphere, window openings on the south side are most effective. These openings can be designed with overhangs that let in the low winter sun but block the high summer sun.
- Reduce glare. Avoid conditions where direct sunlight can come through a window or skylight without being softened by a translucent glazing system, louver, or sunshade.
- Locate openings in ways that benefit your animal patients the most.

38 Daylighting in Animal Wards, Treatment, and Exam Spaces

Based on the idea that daylight benefits animals in the same way that it benefits people, credits can be achieved by including daylighting in exam rooms and wards.

Daylighting can be achieved via windows to the exterior, high light shelves and clerestory lighting, and on interior spaces, via overhead skylights and light tubes such as Solatubes. Use caution when using skylights to develop a balance between daylighting and the introduction of too much heat.

ABOVE A daylit cat ward.
Morningside Animal Hospital - Port St. Lucie, FL

Tip for Design Professionals

Designers should follow the U.S. Green Building Council LEED Checklist for credit IEQc8.1 and IEQc8.2 for guidance in the design of building daylighting systems.

39 Dimmable Lighting in Wards and Exam Rooms

Cats have a minimum threshold for light detection that is six times lower than a human's. Dogs may even see better in dim light (Overall).

The veterinary industry has traditionally recommended a lighting level of 50 foot-candles for areas where patients are examined, which may also include wards. This level of bright lighting can be stressful for patients, so lighting should be designed to dim or step down to 30 foot-candles or less when full lighting levels are not required.

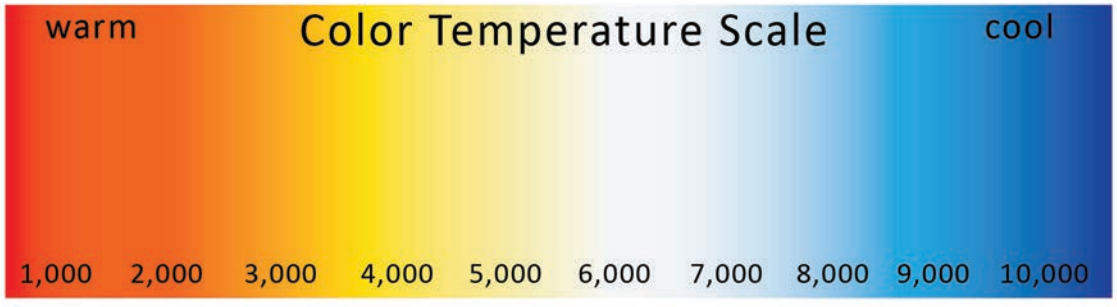
Tip for Design Professionals

Today's energy codes require the use of high-efficiency lighting fixtures such as fluorescent or LED lighting. Fluorescent dimming ballasts are expensive. For cost savings, stepped lighting is a suitable choice for rooms with fluorescent lighting.

40 Full-Spectrum Lighting in Animal Occupied Areas

When choosing lighting for animal areas consider the way that animals see, rather than the way that humans see. Let's start with human eyesight to explain the principles that will guide lighting selections. Two factors become important - Color Rendering Index (CRI) and Color Temperature.

- Color Temperature Scale gauges the hue that a light source produces. This is measured in degrees Kelvin. For reference, daylight has a color temperature of around 5500 - 6500 degrees K, and incandescent has a color temperature of around 2800 degrees K. Because many of us have grown up with incandescent bulbs, lighting that is in the same color temperature range as daylight can feel colder and whiter than what we're used to seeing indoors.



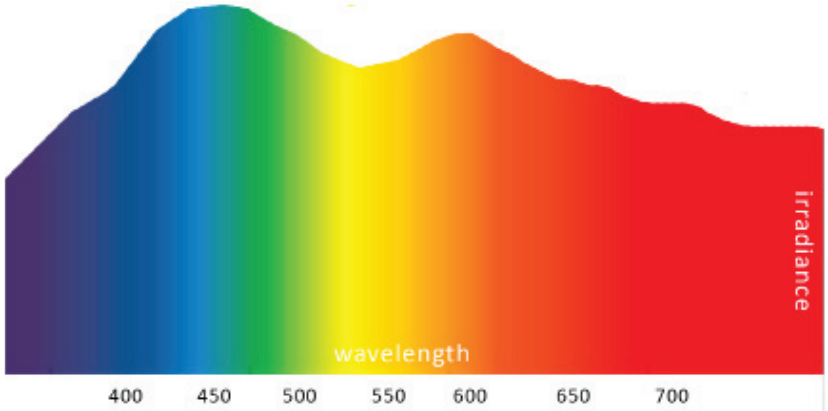
- Color Rendering Index (CRI) is a quantitative measurement of the ability of a light source to reveal the colors of various objects compared to a natural light source. CRI is measured as an average of spectrums revealed. For reference, natural sunlight has a CRI of 100 and has an even spectral distribution across the ranges of visible light that humans can see.

For good lighting, use high CRI fixtures. Some fixtures produce poor ratings (60CRI) and some produce good ratings (100CRI). Incandescent bulbs are rated at 100CRI, but we know from the previous point about color temperature that they produce much warmer light than natural daylight.

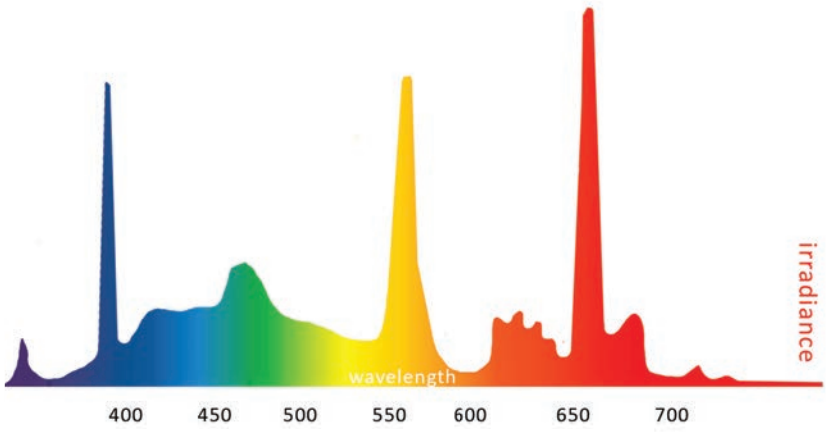
Let's consider what we normally use for lighting commercial spaces - fluorescent and LED lighting. Both lighting fixtures can be purchased with various color temperature bulbs. Let's look at the lighting spectra produced by these two technologies. Both LED and CFL bulbs can be purchased in high CRI indexes of 90CRI or greater, but we can see from the illustration that the lighting may not be consistent across all spectra. This is where CRI falls apart; because it's an average measurement, it still may not tell everything about the quality of the lighting that is produced.

Of the two technologies, modern LED lighting produces superior spectral distribution and a higher quality of light for indoor environments.

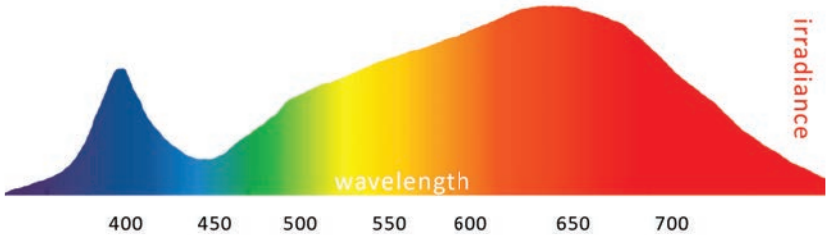
Now let's consider what we know and how it applies to lighting for animals. As we have discussed in other sections, animals do not see well in the red end of the spectrum. We also know that animals do not have the cultural overlays we have that influence our preference for warm (red) indoor light. If anything, we know that some animals such as reptiles, amphibians, and birds NEED a certain amount of UV lighting in long-term indoor environments to maintain baseline health requirements, and even then, may suffer from poor bone density and other health problems if not exposed to natural sunlight, which has higher levels and greater spectral distribution of UV light.



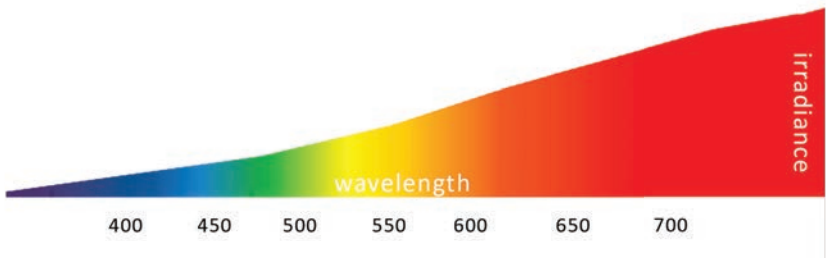
Spectrum Distributions of Sunlight



Spectrum Distributions of CFL



Spectrum Distributions of LED



Spectrum Distributions of Incandescent

Thus, based on the reasonable technologies available, we recommend the following for selecting lighting fixtures and bulbs for animal housing areas:

- Use LED lighting instead of fluorescent lighting when possible because of its superior spectral distribution.
- Always select high CRI bulbs of 90CRI or greater for either fluorescent or LED lighting.
- Use a color temperature of 5000K as a guideline for both LED and fluorescent lamping. These will appear cooler to us than what we may be used to, but they're more like natural daylight. There is no need to exceed 5000K for interior lighting, especially if using fluorescent lighting. Higher temperature fluorescent lamps create harsh, unpleasant lighting with strong spectral peaks that are not all that natural for people or animals.
- If using fluorescent lamps (they're still more affordable than LED lamps), select "full-spectrum lamps" that have better spectral distribution and also have some UV output. Be aware that this small amount of UV output will cause the fluorescing materials (paper, white plastics, and white fabrics) to be perceived as brighter to people. These items are already bright to the animals and should be limited in animal care spaces.

For more reading on full-spectrum lighting and selecting bulbs for Fear Free hospitals, refer to the Lighting Research Center information. This article does a good job explaining what full-spectrum light can and cannot do for people, and by extension, for animals, in indoor environments. Its primary conclusion is that while full-spectrum lighting is important for improving spectral distribution, it cannot confer the health benefits of natural daylight. This in turn reinforces the idea that while we can and should improve the lighting of indoor spaces for people and animals, we must have access to natural daylight to maintain health and well-being ("Lighting Answers").

Background on Noise Control

Designers and architects have been talking about noise control in animal hospitals for a long time. And yet, most hospitals are still loud and clattery instead of the tranquil, peaceful, Fear Free spaces that we desire. Traditional noise control strategies presume that noise has already occurred. What if we focused on prevention as our first line of defense?

- Prevent barking. As discussed in other sections, reduction of barking is an important strategy in keeping the hospital quiet. Simply treating dogs with a Fear Free approach will significantly reduce their anxiety and tendency to bark. So will designing appropriate spaces and preventing dogs from facing each other across aisles.
- Prevent noise in ranges outside of human hearing. Animals perceive frequencies well outside of the ranges humans can hear. Cats in particular have excellent hearing in the high frequency ranges. We tend to design buildings for people, and in doing so, may tolerate hideous high frequency noises and low-frequency rumblings of which we're not even aware. A great rule of thumb is to keep all mechanical equipment far away from animal areas, especially cat wards. We will cover this in more depth in #43, Prevention of Noise and Vibration.
- Prevent unnecessary noise. This includes slamming of cage doors, rattling of chairs, and noises made by audible paging systems. While many of these items are covered in detail in this guideline, it is a general rule of thumb that new hospitals should be designed to prevent any unnecessary noise.

If prevention is the first line of defense, then there is less sound to mitigate. This in turn will allow for the remaining traditional strategies to be more effective:

- Reduction. The art and science of choosing materials that absorb sound.
- Isolation. Building walls that prevent the passage of noise from space to space.
- Dissipation. Placing noisy objects at the far end of the hospital away from quiet zones.
- HVAC design. Ensuring that ducts do not act as conduits for noise between spaces.
- Masking. As a last resort, background white noise can be used to disguise some sounds.

Reduction

Noise reduction within a room is its own unique issue. You may have done your best to prevent excessive noise around the hospital, but even so, each room is its own acoustical environment. Reverberant noise within a space is a big problem in veterinary hospitals because most sanitary finishes do not dampen sound.

The key is to select materials that dampen noise while still achieving the desired level of sanitation. Acoustic materials are rated by a Noise Reduction Coefficient (NRC), with 1.0 representing materials absorbing 100 percent of the reverberant noise that hits them within the laboratory tested frequency range. As an example, a typical acoustic ceiling panel may have an NRC of 0.6. Here are some effective materials for use in your hospital:

- Rubber flooring. Rubber is naturally absorptive and has an NRC of approximately 0.5, depending on the product.
- Acoustic wall panels. A variety of different hanging and wall-mounted acoustic panels are available. Some are easier to clean than others. For example, ripstop nylon covered baffles can be wiped clean. Most acoustic wall panels have fiberglass cores and have high NRC ratings. If you want to get the most bang for your buck, use thicker products, as these are more effective in the frequency ranges in which dogs bark.
- Acoustic ceilings. Acoustic “lay in” panel or “t-grid” ceilings may not be glamorous but they are ubiquitous in office buildings because they provide a space to run mechanical, electrical, and plumbing systems and because they dampen noise so effectively.

Isolation

One of the most developed bodies of knowledge in architectural acoustics is the science of sound assemblies. Sound assemblies are tested and rated with a Sound Transmission Class (STC), which is a measure of how well a building partition attenuates sound. You can get information on the STC of different building assemblies at STCratings.com. Here are a couple rules of thumb:

- Assemblies with greater mass do better. As a result, masonry walls are better at stopping sound transmission than stud walls.
- An assembly is only as good as it is complete. Sound is like light - if you are building a wall to lessen the transmission of sound, don’t forget the major openings in that wall that will leak sound. At a minimum, doors and windows in sound partitions should be insulated and gasketed. In addition, ANY penetration through a sound wall, including ducts and conduits, needs to be thoroughly sealed.

Dissipation

In nature, sound dissipates very quickly because there are few reverberant surfaces. A simple logarithm explains the relationship of decibels to distance - Decibels of Change <=> 20 <x> log (distance1</>distance2). More simply, sound intensity decreases at a rate of approximately six dB for every doubling of distance.

Dissipation may not be a useful method for reducing noise within a room because the distances are small. For example, raising the ceiling height in a dog run room from eight to 12 feet will only result in a three dB reduction in the noise being reflected back from the ceiling. However, within an entire facility, dissipation can be a useful tool. For example, assume the dogs are located 80 feet from the offices, and the noise in the kennels, 10 feet from the dogs, is 100 dB. By the time the sound reaches the offices, it will be 18 dB lower, regardless of other factors. This decrease may not be relevant by itself, but when paired with sound isolation walls and absorptive materials, it may complement the overall scheme to reduce noise in certain areas of the hospital.

This further reinforces the goal of placing mechanical equipment away from animals, and dogs away from cats, in Fear Free hospitals.

HVAC Design

Ducts penetrating from one sound area to another can be a possible source of sound or noise leakage. A ceiling penetration with a diffuser or grille will also allow sound to migrate to another room. Eliminating ducts that penetrate between sound areas can control sound leakage. However, if ducts do penetrate, two things can be done. First, a sound attenuator can be installed in the duct directly at the point of penetration. Care should be taken to seal the joint between the wall and the sound attenuator. Second, a duct can be lined with an acoustical material to contain the sound within the duct system. With these two methods, noise within HVAC systems can be contained and managed from one sound area to another. Care should be taken at all joints or transitions in the installation of the sound controlling devices.

Masking

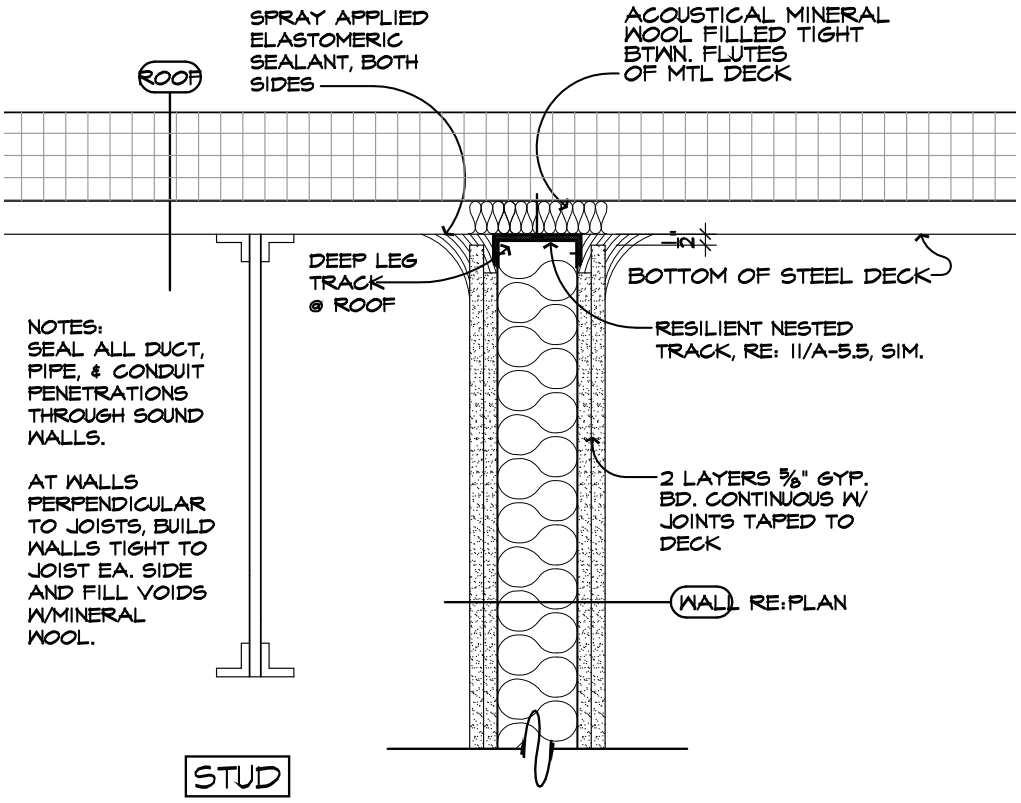
Masking cannot replace other noise control methods, but it may be helpful in addition to them. Because noise is not additive (meaning that adding two noises together does not necessarily increase the overall noise level), it is possible to play soft music or nature sounds to mask a background noise problem. However, be careful with using noise all the time, especially for animals that stay overnight. Animals need quiet as much as we do.

41 Sound Walls between Wards and Treatment

To achieve credit, use a wall rated at STC 43 or greater between wards and treatment spaces. This is readily achievable. A typical 4-inch nominal metal stud wall with fiberglass sound batt and a layer of 5/8-inch gypsum wall board on each side complies. Wood stud walls perform less well and will need an additional layer to achieve the same STC. Sound walls must be tightly sealed to the structure to prevent sound flanking over the top of the wall.

The weakness in this sound wall will be the doors and windows. Use doors and windows that meet an STC of 35 or greater. For a window, this means using two layers of 1/4-inch glazing separated by an air space. Doors should be sound gasketed and provided with a sweep or door bottom to prevent sound leakage.

Both dog and cat wards must be surrounded by sound walls. While cats don't make much noise, they are very sensitive to noises that occur in the hospital.



42 Sound Walls/Buffer between Exam and Treatment

A sound buffer between exam and treatment is not a new concept. It is an idea that has been used in hospital design for decades. In designing Fear Free hospitals, it is helpful to dust off this concept and discuss its importance again.

Sounds occurring in treatment may frighten animals in exam rooms. A sound buffer between treatment and exam areas helps prevent this avoidable problem. A buffer is defined as another space such as lab and pharmacy. If your hospital is not designed with a specific buffer zone, consider at minimum developing a way to have two doors between the exam rooms and the treatment area to cut down on sound leakage.

In addition to using a buffer, the wall around treatment should be designed with an STC 43 rating and STC 35 rated openings, as described below in #43.

43 Prevention of Noise and Vibration

Dogs and cats hear much better than humans do. The range of hearing for humans is 25Hz - 20kHz, whereas dogs hear ranges from 20Hz up to 50kHZ. Cats hear frequencies measuring from 25Hz - 64kHz. In other words, dogs and cats hear high-frequency sounds that cannot be heard by people. In a building, high-frequency sounds may be emitted from electronic equipment, motors, and lighting.

In addition to these high-frequency noises, buildings typically emit low-frequency rumblings from mechanical systems. These low-frequency sounds have been shown to be stressful for humans, and may also be stressful for animals. It is probable that animals can hear these sounds long before we do. For example, within a dog's range of hearing, their sensitivity threshold can be 20 dB less than for humans (Overall).

Considering that animals hear noises that we don't hear, and hear them better, preventing mechanical noise and vibration is a critical goal for designing healing spaces for animals.

Demonstrate compliance with these guidelines for credit:

- Locate rooftop mechanical equipment over spaces other than animal wards.
- Provide mass isolation pads or spring isolators under rooftop mechanical equipment that is located over any medical spaces.
- Provide mechanical equipment with internal vibration isolation.
- If you have an existing building, replace any old fluorescent lighting with new fixtures with electronic ballasts. This will eliminate the buzzing noise that old fixtures emit.
- Locate other motors and mechanical equipment such as housekeeping vacuums, medical suction pumps, etc. in remote closets well away from animal and medical spaces.

44 Minimum NRC of .65 for Ceiling Materials

Ceiling materials in animal and medical spaces should achieve a noise reduction coefficient (NRC) of at least 0.65. It is possible to purchase cleanable products that comply with this requirement. Look for products used in clean rooms, nauditoria (swimming pool rooms), and human healthcare.

45 Species-Specific Music in Each Room

Provide the infrastructure required to allow for species specific music (Through a Dog's Ear or Through a Cat's Ear) to be played in each room containing animals. If using a centralized speaker system, provide individual volume control for each room so that it can be adjusted to be best for the animals in each particular room.

46 Non-Audible Hospital Paging and Alert Systems

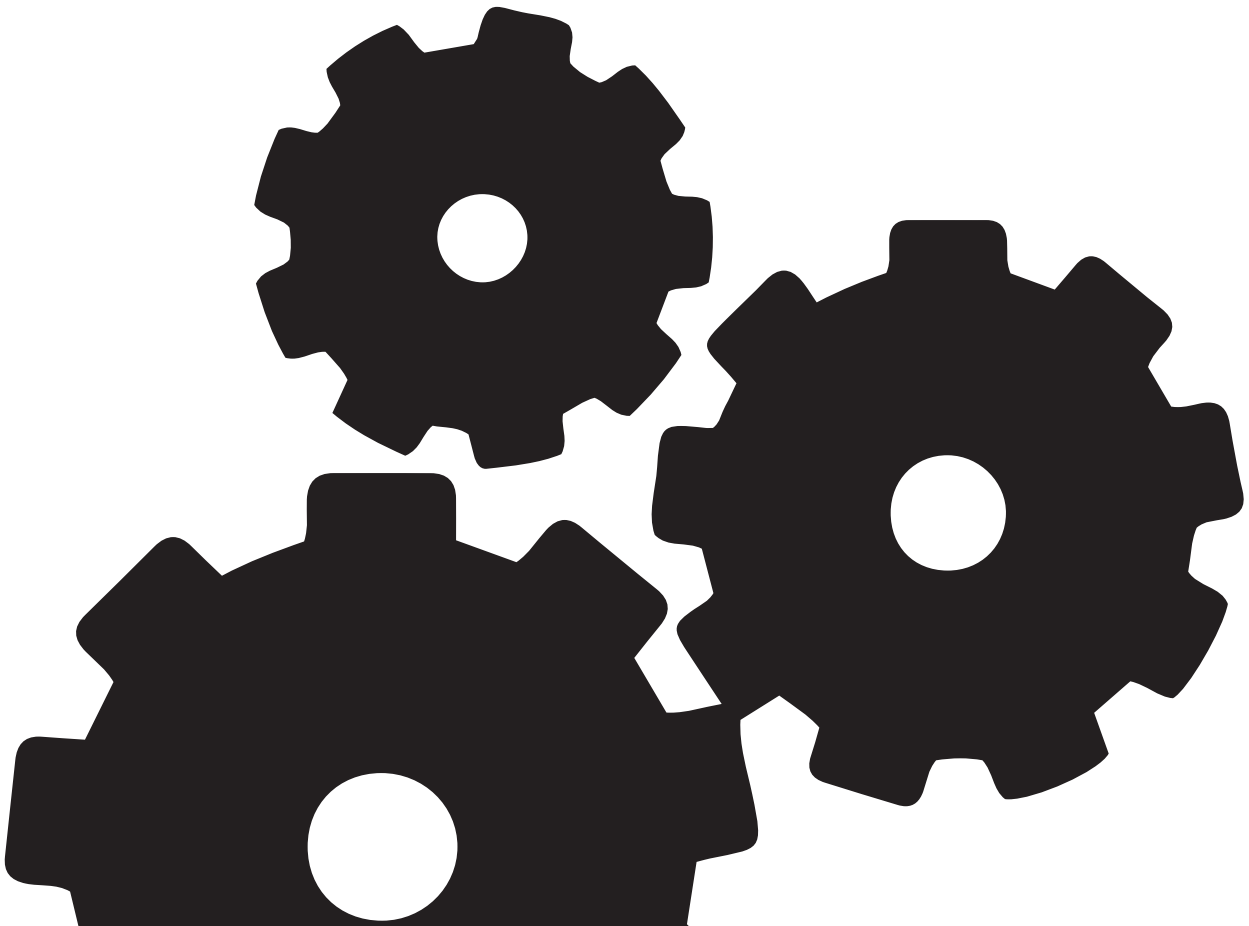
Use non-audible paging and alert systems throughout the hospital such as vibrating pagers, light systems, and digital boards. If using systems that are not a part of the infrastructure of the building, describe the systems to be used.

47 Sound Enclosures around Exam Rooms

While individual exam rooms do not necessarily require full sound walls and sound gasketed doors, at minimum provide walls with fiberglass sound batt insulation around exam rooms to receive credit.

F:

MECHANICAL



BELOW Ventilated cat caging.
Louisiana SPCA - New Orleans, LA

Indoor air quality affects the well-being of people and animals.

The EPA has published information based on thorough studies in public schools. Poor air quality leads to the more obvious problems of acute health symptoms in some people, but it can also reduce the average person's abilities to perform specific mental tasks requiring concentration, calculation, or memory.

In laboratory animals, poor air quality and fluctuations in temperature can result in negative behavioral, physiologic, and morphologic changes in animals ("Guide for the Care and Use of Laboratory Animals"). These effects can be multigenerational ("Guide for the Care and Use of Laboratory Animals"). This is profoundly interesting as it indicates that fear and stress can influence the health of future generations of animals through epigenetic effects.

While it is unlikely that a few hours in a poorly ventilated animal hospital can result in measurable lasting impacts, veterinary hospitals are especially prone to poor indoor air quality because of odors, humidity, chemicals, heavy cleaning, and hair from pets. Research about the effects of building ventilation systems on both people and animals reinforces the idea that Fear Free hospitals should be ventilated with care and expertise.

Most of the ventilation standards that have been developed for animal facilities are based on odor control for these reasons:

- Odor is an indicator of airborne contaminates.
- Airborne contaminates may be unhealthy for animals and staff.
- Airborne contaminates may increase patients risk of exposure to disease.

Little definitive research has been done to indicate whether pathogens are successfully spread through air-handling systems in animal hospitals. However, laboratory animal standards, which have had the benefit of more research dollars, recognize that "the use of recycled air to ventilate animal rooms may save energy but entails risks. Because many animal pathogens can be airborne or travel on fomites (e.g., dust), exhaust air recycled into HVAC systems that serve multiple rooms presents a risk of cross contamination" ("Guide for the Care and Use of Laboratory Animals"). Thus, Fear Free design standards that focus on limiting psychological stress from exposure to odors may also help to minimize biological risk.

48 Separate Dog and Cat Area Air Exchange

One of the simplest baseline requirements is to separate air exchange between dog and cat exam rooms, treatment, and ward areas. Separation may be achieved by 100 percent exhaust systems, or providing separate mechanical units to serve the dog and cat areas of the building. The latter is a more practical approach for exam and treatment areas that don't otherwise require 100 percent exhaust.

A Note about Temperature

For additional comfort for cats, consider keeping cat zones warmer than dog zones. Cats have a higher thermoneutral zone than dogs, with optimal metabolic activity occurring between 85 and 100 degrees F. for unacclimatized cats (Hill). While it is not reasonable to keep staff work zones at 85 degrees, consider keeping feline areas warmer than you would normally, for their comfort.

Tip for Design Professionals

In hospitals where it is not technically feasible to fully separate dog and cat air exchange, in lieu of credit the hospital could boost filtration between the two zones. Use these minimum standards that also help to remove airborne contaminates: "The exhaust air to be recycled should be filtered, at minimum, with 85 - 95 percent ASHRAE efficient filters to remove airborne particles before it is recycled" ("Guide for the Care and Use of Laboratory Animals").

49 Negatively Pressurize Ward Spaces

Differential pressurization is a well-known tool to control the spread of odors and airborne contaminates in hospitals. Ward spaces must be negatively pressurized to receive credit, meaning that more air is exhausted than supplied from these spaces.

50 Achieve Minimum Air Exchanges for Wards

More air must be exchanged in animal ward spaces than in office areas to comply with accepted animal health standards. At the minimum, 10-15 air changes per hour are required in animal wards to achieve credit (Newbury). The number of recommended air changes varies on the configuration and use of the ward. For rules of thumb, use these guidelines:

- Isolation wards should have 20-30 air changes per hour depending on the disease isolated and the size of the room. Small rooms need more air changes than large rooms.
- Run wards need 12-15 air changes per hour.
- Dog cage wards need 12-20 air changes per hour to control odors, unless the air is vented through cages.
- Cat cage wards need 25-30 air changes per hour to control odors, unless the air is vented through cages.

51 One-Hundred Percent Exhaust in Wards

The simplest method to improve air quality is to design HVAC systems that use more outside air than would be used in office spaces. In fact, it is a normal standard in both veterinary hospital design and animal laboratory design to use 100 percent exhaust in animal wards. This means that no air is recycled back into the system. Unfortunately, this strategy is expensive in term of energy, so it is important to incorporate energy saving measures into the design:

- Energy Recovery Ventilators recover the energy of outgoing air to help precondition the incoming air. This can be accomplished without crossing the air streams.
- Air-Side Economizers can save energy in buildings by using cool outside air as a means of cooling the indoor space. When the outside air is both sufficiently cool and sufficiently dry, the HVAC system can act as a whole house fan. Air-side economizers work best in cold and temperate climates.

52 Pheromone Dispensers in Each Room

Locate enough power outlets in cat and dog wards, exam areas, and treatment areas to plug in pheromone dispensers in such a distribution as to allow for the buildup of pheromones in the space. Contact pheromone distributors for advice on placement based on the design of the space and the air exchange rate.

To receive credit, note location and power outlets for pheromone dispenser locations.

53 Ventilated Animal Caging

One of the biggest problems with housing animals in cages is that the cage itself is a barrier to adequate room air exchange. "Ventilating the room (i.e., the macroenvironment) does not necessarily ensure adequate ventilation of an animal's primary enclosure (i.e., the microenvironment), that is, the air to which the animal is actually exposed" ("Guide for the Care and Use of Laboratory Animals"). The solution to this problem is to provide individually ventilated cages.

Individually ventilated cages are relatively simple to use. Air is supplied in front of the cage, pulled through the cage, and then exhausted from the top into the building exhaust ductwork. The simplest installation for ventilation of cages is to build the cages in permanently, although there are some useful precedents for ventilation of cages on wheels.

Fear Free design supports the use of individually ventilated cages for these reasons:

- The animal's physical environment has superior air quality because air is delivered and exhausted directly to the cat's or dog's cage.
- The overall room air exchanges can be reduced. In fact, it is not ideal to move air too quickly over an animal held in a cage as this can create an unpleasant draft. Instead, use the guideline of 20 - 25 cfm per cage. This will guide the development of overall air flow requirements for the room.
- The perception of other animals' odors within the room is reduced.

ABOVE Ventilated cages.
Animal Welfare League of Arlington - Arlington, VA
Photo Credit: Heather Lewis and Mason Company

54 Radiant Heating of Patient Surfaces

Radiant heating is used for animal comfort, and is not to replace the building heating systems. Because of the requirements for high ventilation rates, the sizing of mechanical systems for ventilation normally trumps the requirements for heating. However, warm, radiant surfaces are required to supplement animal comfort in medical areas. To receive credit, the following areas must provide some radiant surface heating:

- Surgery recovery runs and caging.
- ICU/CCU runs and caging.
- Surgery tables.
- Exam tables.

Radiant heating may be achieved by providing products that have built-in heating devices. For run surfaces, radiant heating pads may be provided or electric or hydronic radiant heating may be provided in floor surfaces. Electric radiant heating pads can be provided in ICU and surgery recovery cages.

Animals that are awake and alert should not have access to radiant heating pads, for their safety. For this reason, it is best to build radiant heating into equipment and surfaces when possible. Describe methods for providing radiant heating for patients for credit.

04:
BIBLIOGRAPHY

Overall, MA, VMD, PhD, DACVB, CAAB, Karen. “Your Complete Guide to Reducing Fear in Veterinary Patients.” DVM360, 31 Jul. 2014. Web.

Yin, DVM, MS, Sophia. “Compassionate Vet Care: Handling Pets in a Pet Friendly Manner.” drsophiayin.com, 2 Jun. 2011. Web.

“Falls Among Older Adults: An Overview.” Centers for Disease Control and Prevention. Web.

Wong, Terri. “Chew-Toy Color Preference in Kenneled Dogs (Canis familiaris).” UC Davis, 2007. Web.

Wagner, DVM, MPVM, Denae. “Feline Housing.” UC Davis. Web.

National Research Council. “Nutrient Requirements of Dogs and Cats.” National Academies Press, 2006. Web.

Douglas, R.H., Jeffery, G. “The spectral transmission of ocular media suggest ultraviolet sensitivity is widespread among mammals.” Proceedings of the Royal Society B 281, 1780, 19 Feb. 2014. Web.

McConnell, PhD, CAAB, Patricia B. “Canine Behavior and Acoustics in Shelters and Kennels.” Patriciammcconnell.com, 18 Sept. 2013. Web.

Newberry, R.C. “Environmental enrichment: Increasing the biological relevance of captive environments.” APPL Anim Beh Sci. 1995; 44: 229-243. Web.

National Research Council (US) Committee for the Update of the Guide for the Care and Use of Laboratory Animals. “Guide for the Care and Use of Laboratory Animals.” 8th edition. National Academies Press (US), 2011. Web.

Heschong, Lisa. “Daylighting and Human Performance.” ASHRAE Journal, June (2002), 65-67. Web.

Choi, Joonho, Beltran, Liliana O. “Study of the Relationship between Patients’ Recovery and Indoor Daylight Environment of Patient Rooms in Heathcare Facilities.” Proceedings of the 2004 ESES Asia-Pacific Conference, 17 Oct. 2004. Web.

“Windows and Offices: A Study of Office Worker Performance and the Indoor Environment – CEC PIER 2003.” Heschong Mahone Group. h-m-g.com. Web.

“Daylight and Retail Sales – CEC PIER 2003.” Heschong Mahone Group. h-m-g.com. Web.

“Re-Analysis Report: Daylighting in Schools, Additional Analysis – CEC PIER 2001.” Heschong Mahone Group. h-m-g.com. Web.

Oldroyd, AIA, Susan K. “Daylighting in Schools, Grades K-12.” Architectural Record. Web.

“Lighting Answers.” Lighting Research Center. NLPIP Journal 7; 5, Mar. 2005. Web.

Overall, MA, VMD, PhD, DACVB, CAAB, Karen. “Manual of Clinical Behavioral Medicine for Dogs and Cats.” Mosby, 2013. Print.

Hill, Richard C. “Challenges in Measuring Energy Expenditure in Companion Animals: A Clinician’s Perspective.” The Journal of Nutrition 136, 7. Web.

Newbury, DVM, Sandra, et. al. “Association of Shelter Veterinarians Guidelines for Standard of Care in Animal Shelters. Association of Shelter Veterinarians, 2010. Web.

Other Sources

Griffin, Brenda, and Hume, Kelly R. “Recognition and Management of Stress in House Cats.” Consultations in Feline Internal Medicine. Ed. August, J. Saunders, 2005. 717-734. Print.

Ellis, Sarah L H, Ilona Rodan, Hazel C. Carney, Sarah Heath, Irene Rochlitz, Lorinda D. Shearburn, Eliza Sundahl, and Jodi L. Westropp. “AAFP and ISFM Feline Environmental Needs Guidelines.” AAFP and ISFM Feline Environmental Needs Guidelines. Journal of Feline Medicine and Surgery, 19 Feb. 2013: 219-230. Print. 25 Feb. 2014. Web.

“NAFA Guide to Air Filtration.”2nd edition. National Air Filtration Association. 1996. Print.

AAHA.org

ASPCApro.org

sheltermedicine.com


FEAR FREE
Taking the pet out of petrified.


FEAR FREE
Taking the pet out of petrified.