KNOW BEFORE YOU BUILD

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UC Davis Koret Shelter Medicine Program

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Animal Shelters

- Healthy happy animals
- Good quality of experience
  - Animals
  - Staff
  - Public
- Prevent/eliminate shelter caused disease and control disease transmission
- Staff efficiencies in daily animal care – feeding/cleaning
  - Free up resources to do other tasks related to shelter mission
- Staff safety
- Service to community
- Great place to be and work

Five Freedoms

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

Animal Shelter Facility Design – Top Ten

1. Double compartment housing
2. Right sizing
3. Separation of species
4. Flexibility in housing/facility use of space
5. Allow animal/adopter interactions
6. Noise control
7. Natural lighting and outdoor space
8. Proper ventilation
9. Storage space
10. Thoughtful design for animal care

Animal Sheltering

- Unique system – populations of pets
  - Stressful
    - Confinement housing
    - Very high turnover
      - Animals with unknown health history- vaccination, illness, infectious
        - High disease risks
- Different species – sometimes many
  - Shared and unique housing needs
  - Behavior needs
    - Socialization needs or lack thereof
- Very very similar to a variety of other herd populations


45

Quick Tip: Uniqueness Everywhere

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1. Housing Design

Provides foundation of animal care:

- Affects animal health/well being, risk for disease occurrence and disease transmission, staff efficiency and staff safety.
- Initial cost – roughly square footage
  - $ (single) or $$(double compartment)
  - Same number of housing units
- Once built there is operational/functional and animal well being costs
  - $ = $$$$$$$(single)
  - $$ = $ (double compartment)

Housing Design:
Double Compartment

Housing Design:
Double Compartment

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Housing Design:
Double Compartment Indoor/Outdoor

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Housing Design: Double Compartment Indoor/Indoor

Housing Design: Double Compartment Real Life Room

Why Double Compartment Housing in an Animal Shelter?

Function

- Meets animals behavioral needs/desire to eliminate away from bed/ food/water
  - Stress reduction
  - Research has shown need/desire for this separation in both cats and dogs
    - Support positive behavior - behavior used for house training dogs
- Less confining housing
  - Sufficient space to normally posture, lie down and stretch, move about a bit – stress reduction
- Supports animal health
  - Lower URI rates
- Efficient routine care
  - Routine daily care can be provided in efficient and safe manner
    - Allows ease of less stressful and more efficient care - spot cleaning
      - Less time spent cleaning- more time for other tasks
  - Less time spent cleaning – less time noisy – less stressful day for animals

Why Double Compartment Housing in an Animal Shelter?

- Better disease prevention and control
  - Marked decrease in need for animal handling during cleaning time…. Reduced risk of the human fomite….reduced risk for disease transmission.
  - Less handling during cleaning = less stress for the animals
- Staff safety
  - Less mandatory handling….less risk for staff injury
- Best practice
  - Meets ASV guideline recommendations for standards of care in animal shelters

Win Win Win Win Win Win

- Cost
  - Upfront cost is more – about double
  - Long term cost savings in animal health, treatment costs, staff time, staff injury…year after year after year

Win

Double Compartment Housing

- Component of animal welfare that is built in
  - If they chose - elimination can occur away from bed food and water

Double Compartment Cat Cages -Specs

- Floor space 9 ft^2 or greater
  - Favorite for flexibility and space: two 30” wide cages with a portal
  - Basically: minimum - a cage that is 4’ long and 28” deep that has two compartments within
    - Two 2x2 cages with a pass through
    - A 48” wide cage with a 33” main compartment and a 15” litter compartment

Double Compartment Cat Cages -Specs

- 2 compartments
  - Side to side and/or up to down
    - Flexibility in use
  - Normal posturing
- Shelving should be minimum 12” wide
- Bars are great – adopter/animal interaction…start bond at 1st meet
- Height 30” max for stackable cages(5’ when stacked)
  - Allows it to be raised off ground- less stress cats and better for staff
    - max top of cages height ~6’ – people issue
  - Minimum 28” if purchasing new

Caution:


ON HOLD
Medical Hold
In Memory of
SMOKEY & SAM


ON HOLD
Pet Mobile

Caution:

Double 30” Cages = Flexibility

Quick Tip: Cat Housing

- Most existing single cat caging can be improved to double suites via portalizing.

- www.sheltermedicine.com
  - Search “new portal”


1
CAT

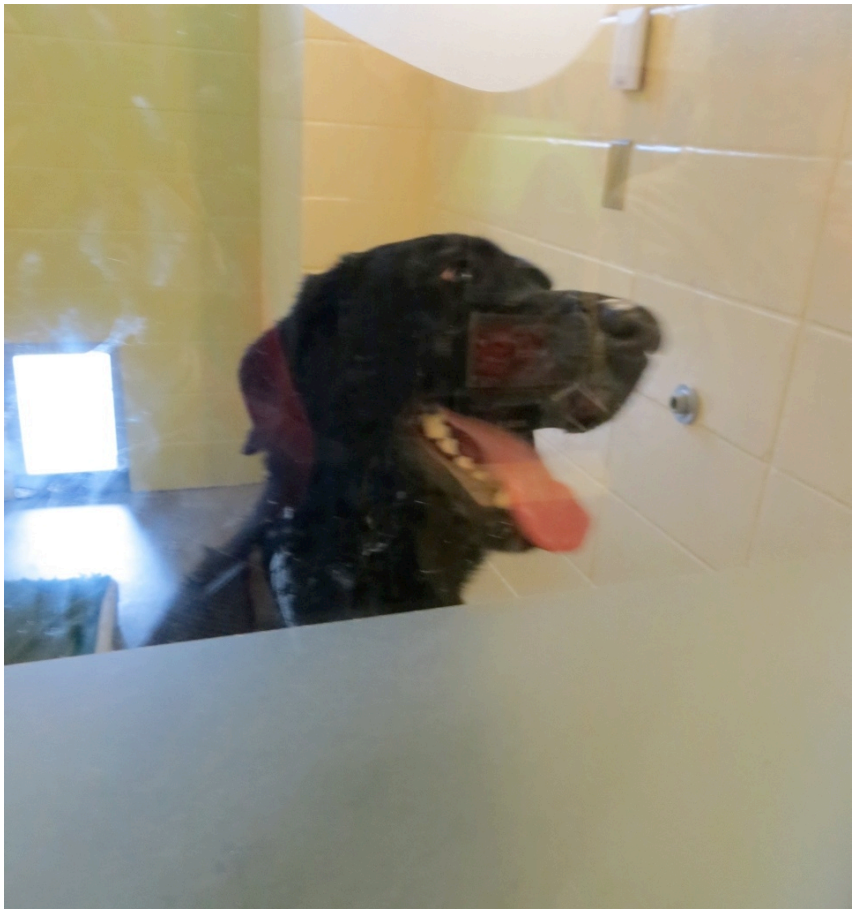
Double Compartment Kennels - Specs

- Old school design
  - Front to back kennel
    - Front to back transfer door
      - Notice transfer door span
    - Indoor/outdoor or indoor/ indoor
      - Both are good
      - Preference for outdoor when possible
    - Side to side transfer is ok – doesn't have all the benefits of front to back
  - Solid sidewalls to at least 4'6"

Double Compartment Kennels - Specs

- Width - variable
- Length - variable
- Bars are great
  - Adopter/dog interaction
  - Ventilation
  - Alternative - Dutch door
- Visual barriers- careful
  - Use pathways when possible

Quick Tip: Visual Barrier…Careful



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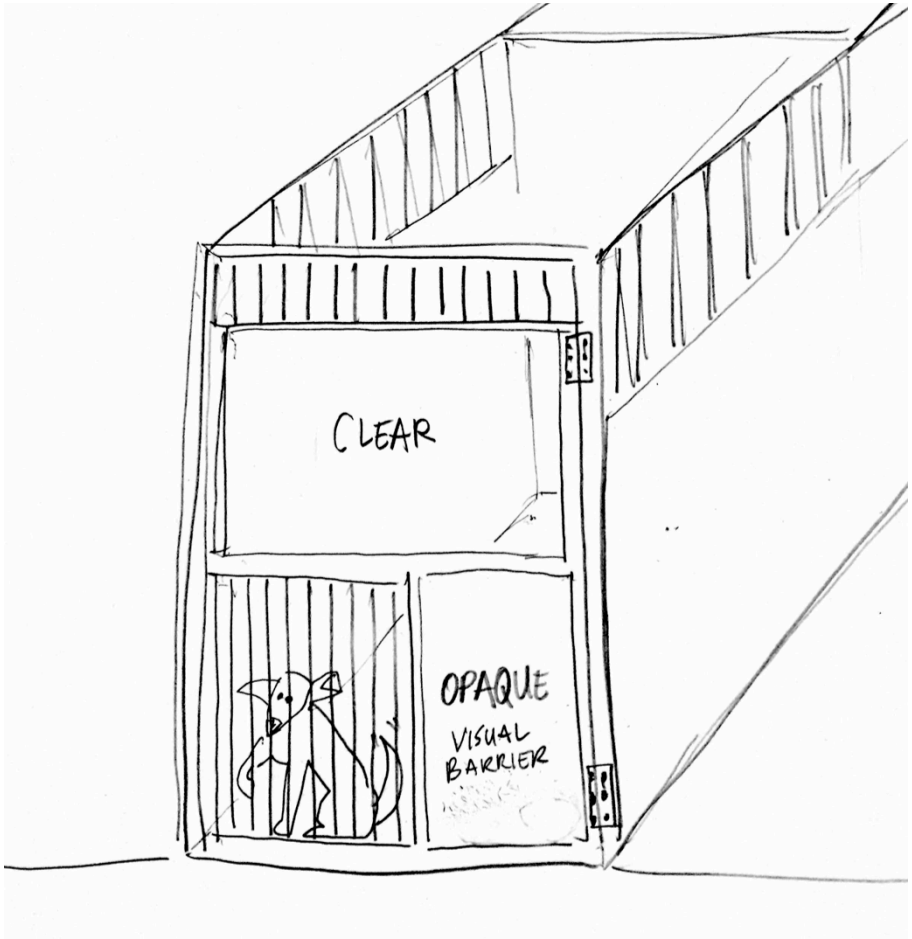
Dog Kennel Door Idea



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Notes on Indoor/Outdoor

- Access to outdoors
  - Visual stimulation
- Less conditioned space to heat/cool
  - Use dog door
- Decrease risk of respiratory disease
- Elimination area outside
  - Away from public
  - Reduced odor
- Noise
  - Good to not so good

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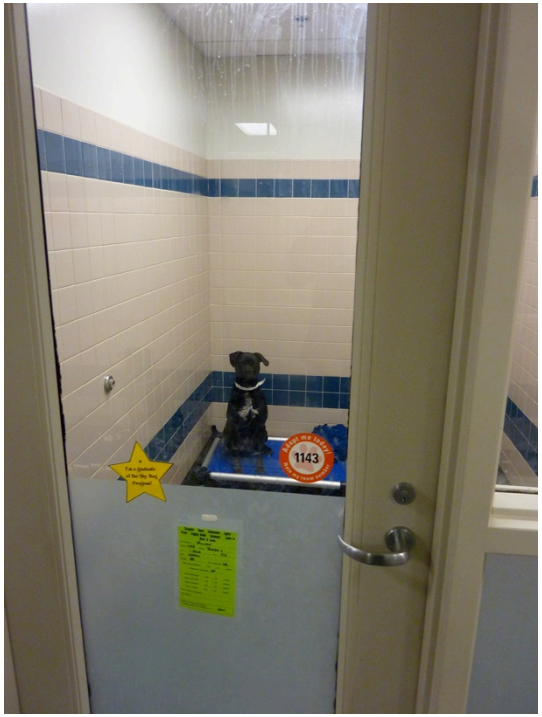
Adoption Housing

- Variety to meet needs
  - Animal
  - Adopter

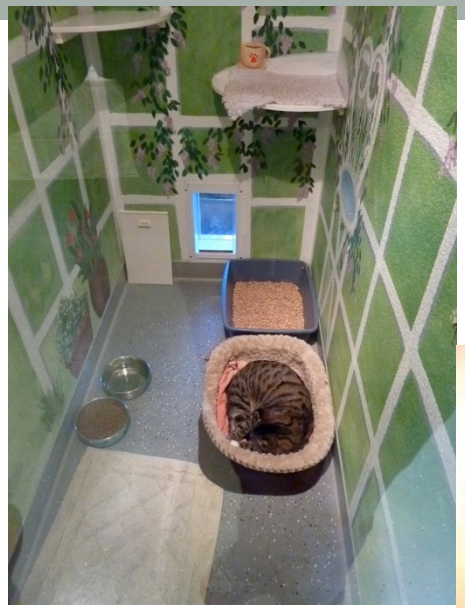


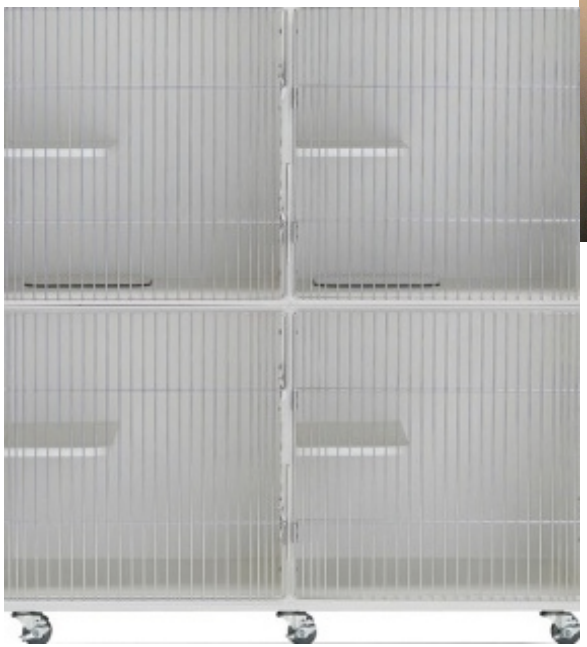
Adoption Housing

- Double compartment
  - Cages
  - Kennels
  - Rooms(dogs)
    - Cat group rooms fine
      - Porches are great though

Cat Adoption

- Variety
  - Cages
    - Portals/passthroughs: Up to down and side to side portal - flexibility
  - Individual rooms
  - Group rooms





Dog Adoption

- Real life rooms
  - Double compartment
  - Supports house training behavior
    - Helps contain waste out of site
- Kennels
  - Fast trackers
    - Efficient housing
  - People that want to adopt from kennel housing

Quick Tip: Laminate Housing – Don't Use in Wet Environments

- Particle board absorbs moisture

2. “Right sizing”- Capacity

- Not too big not too small
  - “Just right” – Goldilocks it
    - Function of design: Intake and LOS
      - Careful – need to look at max intakes
        - Cat capacities- seasonal doubling needs
    - Flexibility

- “Just Right” Target Ave. LOS:
  - 10-14 days
    - Yes there are exceptions….what is your mission

Pre-Construction Cost = $

- Immediate costs
  - Building cost – budget – X dollars - easy
  - How this money is spent - harder
    - Generally we can't have everything we want
    - Generally a need to prioritize where dollars are spent
      - Many very important things
      - Hard to know priorities

Know what you need/want then seek out resources and get expert help

- Highly recommend involving animal shelter specialists: consultant architects, engineers and folks that are animal shelter population health experts (not all veterinarians are) in the planning and design process of your animal shelter facility.

Post-Construction…. Known and Unknown Costs/Benefits

- Operational
  - Staffing
    - Expectations and what is actually needed
  - Energy cost
  - Maintenance
  - Efficiency of use- performance
- Staff satisfaction/turnover
- Volunteer support/participation
- Meeting mission
- Community good will
- Donor support
- Animal health and well being

Think about all of this before you build. Use your mission statement to help you hone in on what is needed/wanted.

Animal Health and Well Being

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Length of Stay

Initial cost, building costs = # housing units
Once built there are also daily care costs and animal health costs

- Shorter ave. LOS
  - Need fewer housing units
  - Short LOS means less daily care costs/animal
  - A housing unit is freed up more often for sheltering another animal
    - Ave LOS 40 days, housing unit can serve up to 9.1 animals/year
    - Ave LOS 14 days, housing unit can serve up to 26 animals/year
- Longer ave. LOS
  - Need to provide more housing units
    - $$, $$$$, $$$$$$$$
      - Animal health in general decreases with increasing LOS
      - Larger facility
      - Ability to serve numbers of animals is reduced
        - …fewer lives saved

Length of Stay (LOS) in Holding

- LOS
  - Required hold + management = Hold housing needs

Daily Intake	Required hold	Ave. Observed hold	Housing units needed
10	3 days	3 days	30
10	3 days	6 days	60

- Big impact on housing needs in holding
- Big impact on daily care needs of facility
- Likely impact on animal health

Capacity:
Flow Through and Daily Head Count

- Annual Intake 4500
  - Monthly daily average intake 12 animals a day
- 2 possible scenario shelters
  - Shelter “A” has 500 housing units and holds up to 500 animals
  - Shelter “B” has 200 housing units and holds up to 200 animals, annual care days = 73,000

  - Potential annual animals served “A” = 4500
    “B” = 5200

Ave. LOS “A” = 40
Ave. LOS “B” = 14

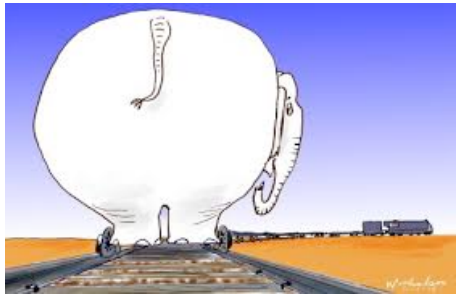
Ave. LOS = 10 days, need 123 housing units to serve 4500 animals

Capacity

This is just math – function of the design. Shelter "A" could easily operate identical to shelter "B" by only using 200 housing units - their ave. LOS will reduce to 14 days. Unfortunately it is really hard for a 500 housing unit facility to operate with 300 empty housing units because there is this law: Murphy's Law for animal shelters…any open housing tends to fill. Maintaining open housing even just for proper operations can be hard to pull off in some communities – even when it is the best thing for well being and welfare of the animals and resource allocation of the shelter.

Overbuilding is super risky-can lead to basically the operation of big costly "boarding" facility.

“Right sizing”- Capacity



- WHAT ABOUT FUTURE GROWTH?
  - Expected human population growth does not automatically = expected increase in animal intake
    - Examine trends in shelter data and community
  - Existing and future shelter programs and outreach have big impact on intake, LOS and future housing needs
    - Examples:
      - Spay neuter services
      - Return to owner in field (dogs)
      - Food bank
      - Help desk- solving problem prior to an intake
      - Low cost clinic
      - Community cat programs

LOS

- Best thing: you don't have to wait until you have a new facility to try it out – many of the LOS tools available can be put into practice in your current facility.

www.sheltermedicine.com

- LOS information sheet
- Capacity 4 Care (C4C)
  - Fast tracking
  - Open selection

Quick Tip – Vaccine Refrigerators

- Small refrigerator – under counter refrigerator- vaccine fridge
  - Use refrigerator only vs refrigerator/mini freezer
    - Maintains more consistent temperature
      - Intake exam areas, clinic areas

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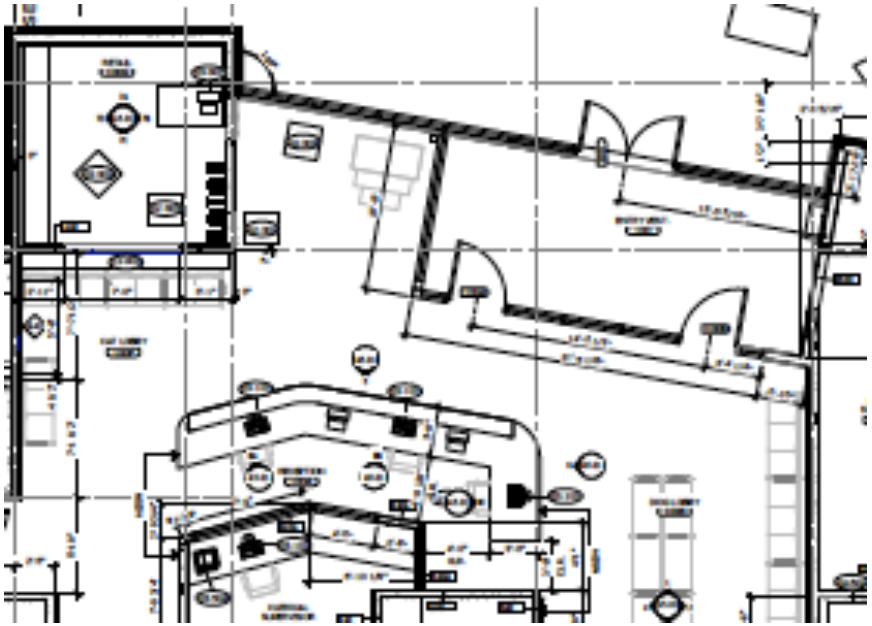
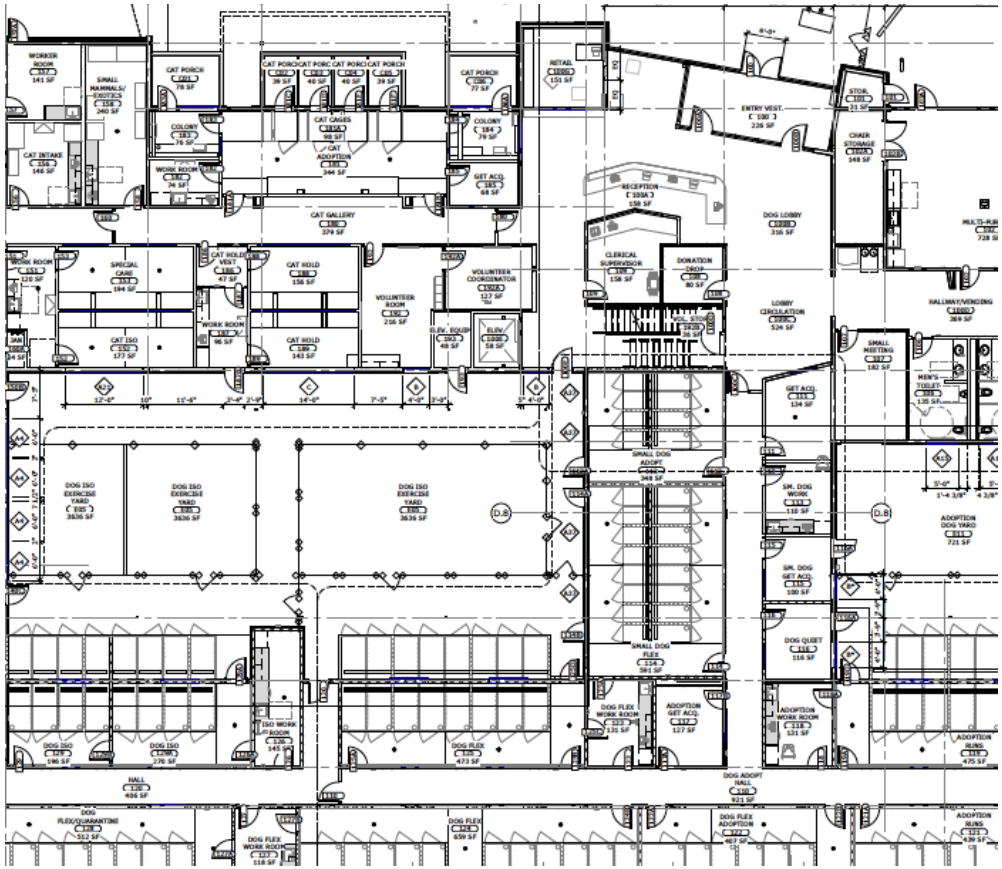
3. Separation of species

From arrival to outcome

- Separate areas in the lobby
- Separate intake rooms
- Separate housing areas
- Separate pathways if possible



3. Separation of species



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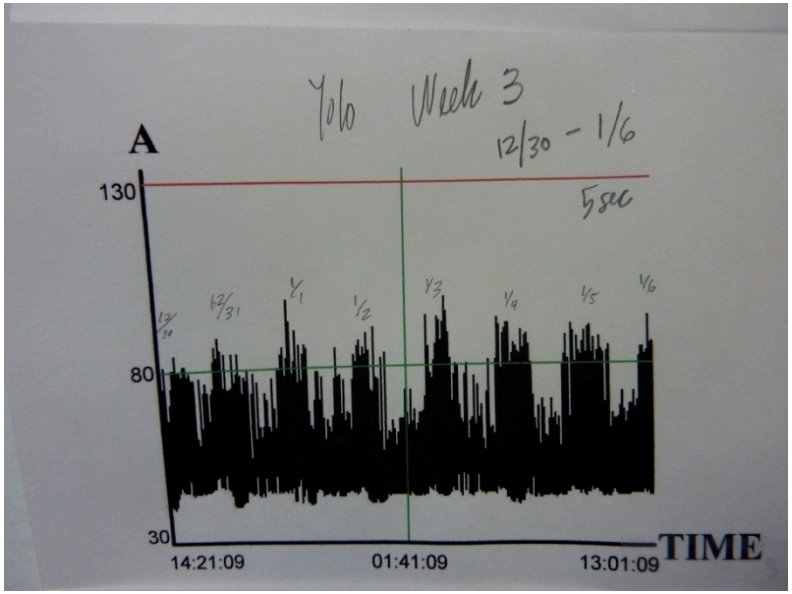
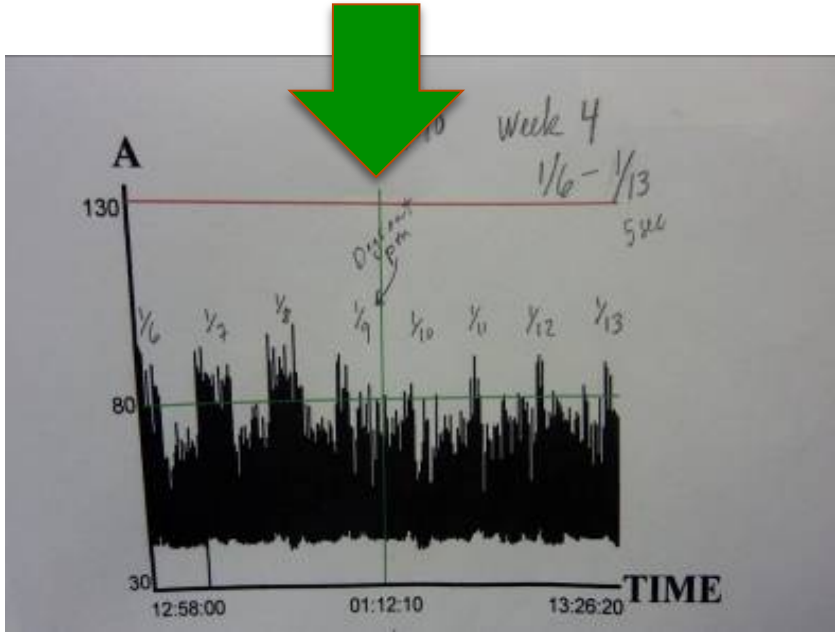
Problematic

Problem

Cat housing (2 chihuahua's)



Cat housing w/o dogs



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Quick Tip: Kennel Flooring

- Resinous epoxy
- Resinous Urethane
- Tile with epoxy grout

Quick Tip:

- Dog Kennel sizing:
  - Width: minimum 3’6” for medium to larger dog, best is 4’ or greater
  - Length can be variable
    - Normal kennel – no shorter than 8’, better if 9-10’, 12 or greater is very nice.
  - Double compartments can be of differing size

  - Provide some large kennel for giant breed dogs, mom and pups, co-housing of paired dogs, etc
    - Width in the 6’> range, length can be similar to other kennels
    - Make sure transfer door is adequate sized(generally will need to be bigger than the doors in the other kennels)

  - Small dog kennels – house in separate room- indoor/indoor
    - Width minimum 3’ (people limitation)
    - Length 6’

4. Flexibility

- Housing rooms
  - Flex use
    - Hold, adoption (transfer housing hold then open when hold is done for adoption without having to move the animals)
    - Depth of public access variable and easy to do
- Mobile housing so room use is easy to flex
- Quiet room/get acquainted room
- Have some bigger kennels to meet variable needs in dog housing(make sure pass through adequate for dog size)

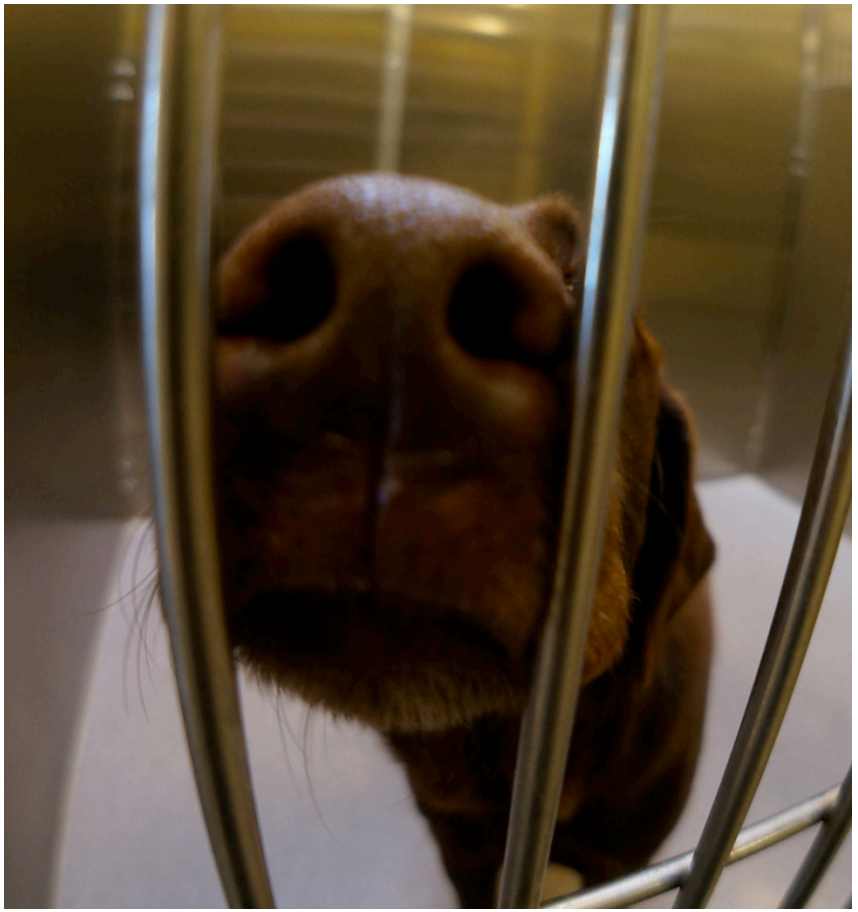
Flexibility

- Multipurpose room that can be used for disaster/ emergency housing(flooring treatment, water access, drains, lighting, etc
- Multipurpose room location near front of shelter to use for vaccine clinic
  - Entry and exit doors
- Transfer housing dogs
  - Ability to partition off kennels to allow groups to arrive and be separated from general population - mobile partitions
- Barn space that can be flexed for group housing hoarding cats

Flexibility

- Housing
  - Ability to use for more than one species
  - 6’ double compartment housing for cats or small dogs
    - Not at the same time ☺

5. Allow Animal/Adopter Interactions



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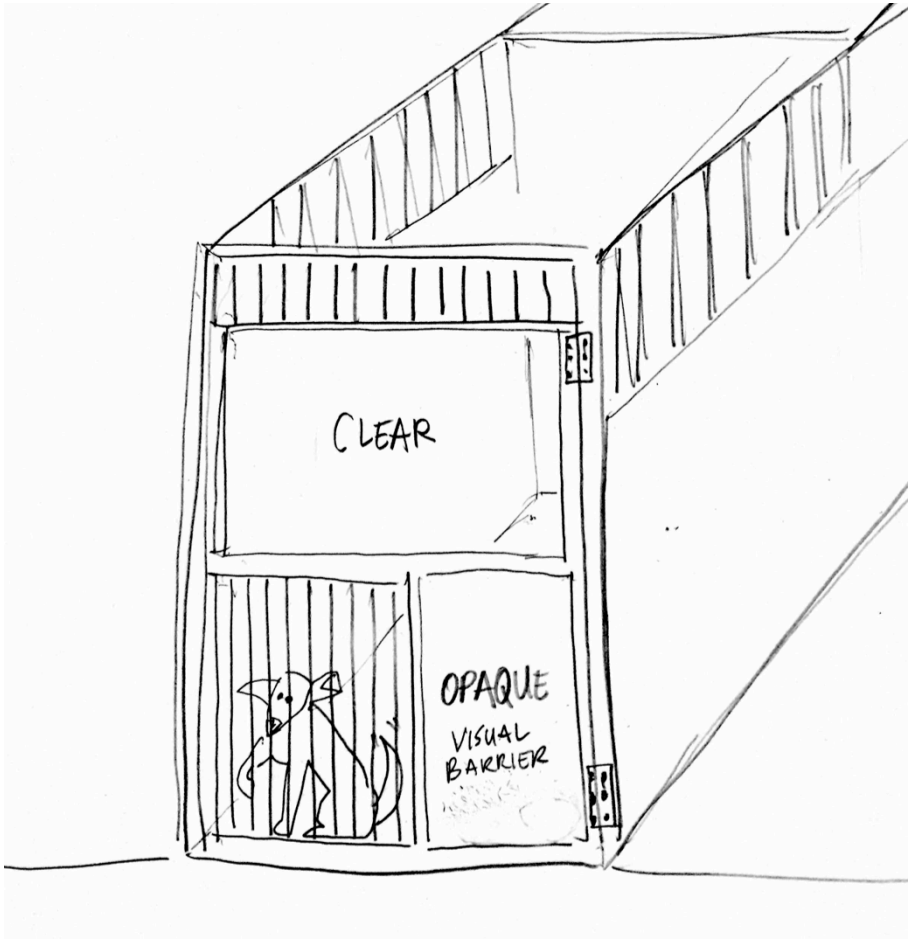
Dog Kennel Door Idea



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Quick Tip: Grates are Great

- Natural ventilation
  - Easier to assess the in cage environment
- Adopter/cat interaction
- Public are extremely low risk fomites
  - Allow animal/people contact in adoption areas

6. Noise control

- Separation of species
- Management
  - Treat buckets/ training in kennels
- Soundproofing of room entry doors
  - $200-300 – kits – essentially "winterizing" - eliminate air flow
- Soundproof doors
  - More expensive
  - Strategic placement
    - Noisy area to quiet area
      - Lobby to cat housing hallway
- Noise absorption panels
  - Very effective to decrease reverberation of noise
  - Cover a substantial wall/ceiling surface area
  - Relatively Inexpensive
  - Aesthetics?

Quick Tip: Feral cat housing

- Cage housing does not meet feral cat needs
  - Trigger fight or flight
- Feral/Barn Cat Housing:
  - Pen housing outdoors or indoors

  - Better environment for the cat
  - Staff efficiency and safety

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7. Natural lighting and outdoor space

- Natural lighting in all animal housing areas and high use areas.
  - Provides good living environment for shelter animals
  - Helps to reduce lighting cost during daylight hours
  - Allow daily care to occur when power is out
- Indoor/outdoor kennels
  - First choice if possible for dogs
- Garage doors to allow outside in

Natural lighting and outdoor space

- Outdoor space
  - Increase usability with sun and rain protection over some portion
  - Get acquainted areas
  - Small to large exercise areas
  - Dog parks- private or public

- High use shelter dog areas –concrete for easy cleaning
  - Note: do not put plantings in high use outdoor areas

Quick tip – Dog Doors

- Help to maintain indoor environment
- Kennel Plex:
  - Saloon style

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8. Proper Ventilation

- Lots of interest and money spent on ventilation in new buildings
  - Yes it is important
  - Many older facilities not ventilated adequately
    - Real problems with air quality and wet environment
      - High disease risk
        - Must have dry environment for animal housing areas

Proper Ventilation

- ASV guidelines 10-12 air exchanges/hour
  - Needs to be delivered to the location of where the pet is housed
    - Pens and cages can set up micro-environments
      - Air is shared
        - Effects can be mitigated via directing/ blanketing of housing space with air entering room
        - Air enters into housing unit- then into room- or visa versa - then exhausted
          - Linear flow
          - Achieves delivery of good quality air to the level of the animal and minimizes risk of infectious airborne disease
            - Airline ventilation
            - Calf barn positive pressure ventilation
              - Reduction in calf respiratory disease of 20- 30%
  - Larger housing units –easier to get air into them
    - Less of a microenvironment

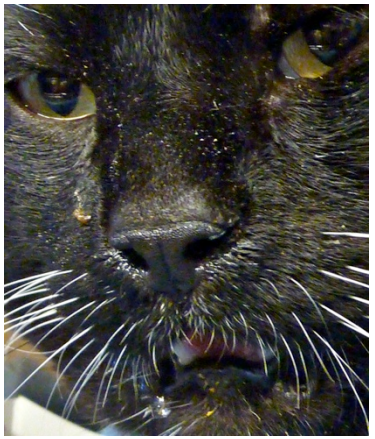
Proper Ventilation

- Ventilation is also used to remove odor
  - Higher ventilation rates can be effective
    - Drafts are undesirable
    - High ventilation rates costly energy use for conditioned air
  - Alternative odor control
    - Indoor/outdoor housing – poop and pee outside
    - Frequent removal of waste may be as effective- certainly recommended
      - Need staff/volunteer time
    - Perhaps some solutions through alternative housing designs? – double compartment where waste area is not visible nor smellable to adopter.

Quick Tip: Feline Respiratory Disease

Cat upper respiratory disease in animal shelters is caused primarily by stress and is not spread through the air.

- Most URI occurs secondary to reactivation of feline herpes virus that many cats arrive at shelters already carrying
- Reduce stress through proper feline housing and a good housing environment and this disease almost disappears in the shelter environment.



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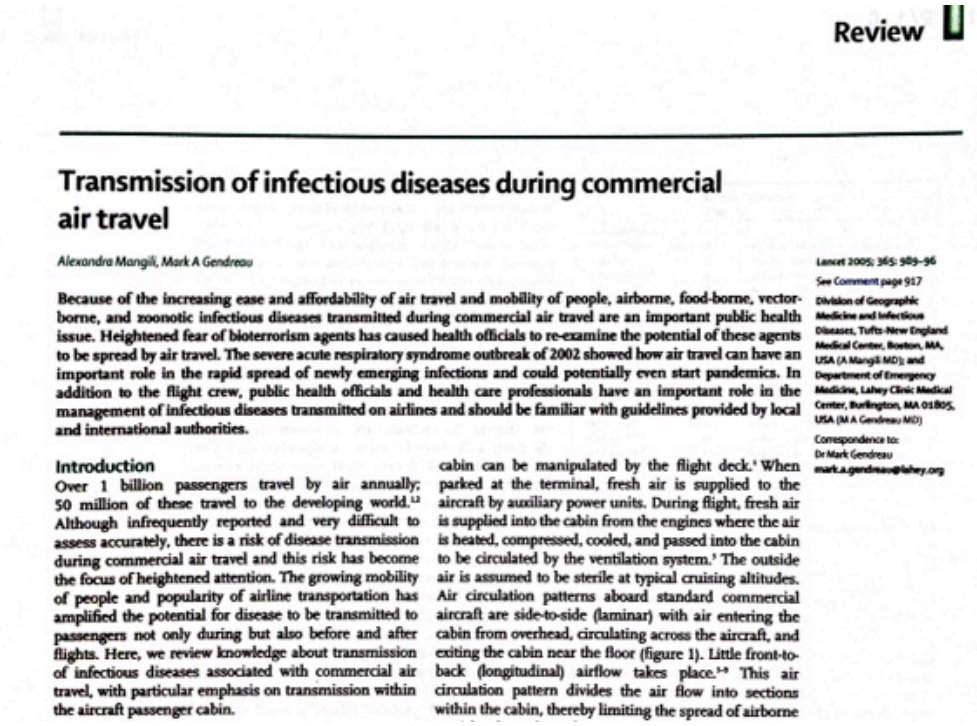
Quick Tip: Air Travel

- Use your overhead air vent to direct air into your lap
  - Reduce risk of airborne disease
  - Hepa filtered air
    - Very effective in reducing infectious organisms
  - Fomite is #1 way infectious disease spread
    - Given that ventilation system is working



Review

Transmission of infectious diseases during commercial air travel

Alexandra Mangili, Mark A Gendreau

Lancet 2005; 365: 989–96
See Comment page 917

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Because of the increasing ease and affordability of air travel and mobility of people, airborne, food-borne, vector-borne, and zoonotic infectious diseases transmitted during commercial air travel are an important public health issue. Heightened fear of bioterrorism agents has caused health officials to re-examine the potential of these agents to be spread by air travel. The severe acute respiratory syndrome outbreak of 2002 showed how air travel can have an important role in the rapid spread of newly emerging infections and could potentially even start pandemics. In addition to the flight crew, public health officials and health care professionals have an important role in the management of infectious diseases transmitted on airlines and should be familiar with guidelines provided by local and international authorities.

Introduction

Over 1 billion passengers travel by air annually; 50 million of these travel to the developing world.[1,2] Although infrequently reported and very difficult to assess accurately, there is a risk of disease transmission during commercial air travel and this risk has become the focus of heightened attention. The growing mobility of people and popularity of airline transportation has amplified the potential for disease to be transmitted to passengers not only during but also before and after flights. Here, we review knowledge about transmission of infectious diseases associated with commercial air travel, with particular emphasis on transmission within the aircraft passenger cabin.

cabin can be manipulated by the flight deck.[3] When parked at the terminal, fresh air is supplied to the aircraft by auxiliary power units. During flight, fresh air is supplied into the cabin from the engines where the air is heated, compressed, cooled, and passed into the cabin to be circulated by the ventilation system.[3] The outside air is assumed to be sterile at typical cruising altitudes. Air circulation patterns aboard standard commercial aircraft are side-to-side (laminar) with air entering the cabin from overhead, circulating across the aircraft, and exiting the cabin near the floor (figure 1). Little front-to-back (longitudinal) airflow takes place.[3–5] This air circulation pattern divides the air flow into sections within the cabin, thereby limiting the spread of airborne

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9. Storage space

- A top complaint: not enough storage
  - Storage space is like housing units- shelters will fill whatever is available
    - Aim for strategic useful storage
      - Closet in new building will cost 1000's of dollars
- Take time to look into storage needs
  - Amount of inventory you will want on hand
    - How much space is needed
    - Where does it need to be located
  - Future needs- new programs
    - Volunteer program- office, storage needs for on site work and off site work- tables/banners/etc
    - Agility area - where is storage?

10. Thoughtful design for animal care

- Design for animal and people flow through- more than one way to get to an area
  - Variable depth of entry for public if desired
  - Pathways
    - Intake to housing, housing to services, adoption to home
- Floor slopes to drains, proper drain type and drain placement to insure low disease transmission risks and quick drying floors in housing areas with high water use.
- Flooring material to insure sanitation, safety and durability
- Building orientation for window placement, lighting/heat gain in animal housing areas for animal care and comfort
- Recessed hose bids
- Adjacencies

Quick Tip – Backups

- Areas to have basic backup systems in place
  - Cleaning
    - Hose bibs in all dog housing rooms and your automatic system
    - Deep sinks in prep area as well as automatic dishwasher
  - Ventilation
    - Operable windows
      - Provide ventilation whether there is electricity or not
      - Security issues
  - Natural lighting in all animal housing areas
    - Provide day lighting
      - Nice living environment
      - Can perform needed daily care tasks if electrical power is out
  - Generator back ups

Quick Tip: Cat Rooms

- Cat rooms that provide visual stimulation- windows to look outside, other cat housing
  - Housing facing bare walls is tough on
  - Actually facing other cages is ok
    - Provide partial visual barriers
  - Larger room with caging along perimeter

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Quick tip: New Portal Available

- www.sheltermedicine.com
  - Search for “new portal”
- SS Install instructions
  - Plasma saw
  - Nibbler


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Resources

- www.sheltermedicine.com
  - Fast tracking
  - Open selection
  - Capacity for Care C4C:
    - http://www.sheltermedicine.com/documents/business-of-saving-lives-capacity-for-care-for-cats
- MCC (Million Cat Challenge) http://www.millioncatchallenge.org/
- Facility design:
- http://www.sheltermedicine.com/shelter-health-portal/information-sheets/facility-design-and-animal-housing