



Helping shelters
help animals

UC DAVIS KORET SHELTER MEDICINE PROGRAM

The UC Davis School of Veterinary Medicine is a statewide program conducting teaching, research and service benefiting animal, human and environmental health.

Calculating shelter capacity

Understanding and maintaining shelter capacity is fundamental to provide humane standards of care, maintain animal health and maximize live release. Given the great number of homeless pets in need of care, it can be difficult to imagine defining, let alone providing, “sufficient” capacity for this seemingly infinite population. However, the problem of homeless animals is not really one of *holding* capacity, but one of *flow through* capacity. Of course we know this already: if a shelter simply admitted all animals that came through the door and never released them, virtually all facilities would soon be impossibly overcrowded. We know that ultimately the problem must be largely solved by reducing the number of animals in need of shelter through preventive programs, and by ensuring that the remaining homeless animals pass through shelters successfully to a positive outcome. Fortunately, sufficient capacity is a much more attainable goal once we realize that we do not need to “house our way out of overpopulation” but simply provide humane conditions for a finite number of animals as they pass through our care.

Interestingly, being either under or over capacity can have equally harmful effects. Thus it’s important to define both minimum and maximum *optimal* capacity for each organization. On the one hand, if minimum required capacity is insufficient, animals may be needlessly euthanized and crowding will be a constant, resulting in high levels of stress and disease. These hazardous conditions will persist indefinitely unless minimum capacity is defined and targeted plans developed to correct gaps between current capacity and actual needs. For instance, if current adoption holding areas are too small to hold a sufficient selection of animals for adoption, it would be much better – and probably more cost effective in the long run - to make a one-time fundraising push to build additional housing rather than chronically compromising adoption numbers with too few available or forever crowding animals into insufficient space. Likewise the results of chronic understaffing will be predictable, ongoing lapses in care that will have adverse effects on health and adoption as well as exert considerable stress on staff. Better to identify and correct the gap through increasing staff or skilled volunteer work force, investing in less labor intensive systems, or reduce the number of animals housed at any one time.

If *maximum* optimal capacity is unknown or capacity is excessive, this too can have adverse effects. The emerging science of choice provides ample evidence that people confronted with an over-abundance of options are less likely to choose any, and less likely to feel positive about any choice made under these conditions. Even if presented well, too many animals available at one place and time may inhibit adoptions.

Maximum capacity will also impact the amount of time each animal spends in the shelter. For a given intake number, the greater the capacity of the facility the more time each animal will tend to remain in the shelter system. For instance, if 10 animals a day are admitted to a shelter that holds 150 animals and is kept full, each animal will spend on average 15 days. If 10 animals a day are admitted to a shelter that holds 300 animals, you can readily see the effect: each animal will spend an average of 30 days. *If* additional holding time were likely to contribute to a greater likelihood of reclaim or rehoming, then this would be desirable. But for many animals, additional time in the shelter actually has detrimental effects. A number of studies have shown that time in

the shelter is the single greatest risk factor for illness, outweighing other important factors such as age, source, and vaccine status[1-4]. And even in the best of shelters, it is difficult to maintain behavioral health and the quality of life equivalent to a home during prolonged confinement[5].

Finally, maximum capacity will impact daily operational costs. Clearly it will cost more to staff and operate a shelter with 300 animals on site each day than a facility with only 150 animals. As noted above, it does not make sense, nor is it effective, to skimp on needed capacity as a cost saving measure. However, increasing capacity cannot be justified unless it has a life saving benefit, and certainly not if the primary effect is to increase risk for illness and possibly even decrease adoptions. There are plenty of other priorities upon which we can usefully expend our limited resources – spay/neuter programs, behavior help lines, support services to keep animals in their homes, and other measures to reduce the number of animals needing shelter in the future.

So, like Goldilocks and the Three Bears, we're looking for the number that's "just right", not too big and not too small. Building capacity may require an initial investment, but in the long run nothing is more costly than the effects of chronic crowding and under-staffing. Being within capacity, on the other hand, can have positive effects on animals, staff, adopters, live release numbers and even the financial bottom line.

Capacity basics

While the notion of calculating capacity can seem overwhelming, in fact a few basic calculations combined with data available from commonly used shelter software systems can provide a solid foundation. Even rough estimates based on annual data can be valuable if that's the only information available, and can provide the impetus to collect more detailed monthly data in the future.

The most important capacity calculations are listed below. These can all be calculated using monthly reports of intake numbers by type (e.g. stray, surrender, transfer), outcome number by type (e.g. reclaim, adoption, transfer, euthanasia) and some means of estimating daily population. In general, it's helpful to calculate capacity based at least on species, and if possible, by age (juveniles < 20 weeks versus adults). Housing, daily care and flow-through staffing requirements may differ between puppies and kittens, dogs and cats. In some cases it's also helpful to calculate breed- or condition- specific capacity if special housing or handling are required or if outcome options are different than for other animals of that species (e.g. feral cats may be candidates for spay/neuter/release but not adoption). With the exception of daily population, these are numbers many shelters are already collecting, and only a few straightforward calculations are needed. Famous last words I know, but bear with me.

Basic capacity calculations

- **Physical holding capacity:** this is the physical space required for animals in stray hold, quarantine or other required/desired finite holding periods prior to being made available for adoption. This includes animals that can be viewed for adoption but are not currently ready to go home.
- **Adoption driven capacity:** this is the optimal number of animals to have actively available for adoption, or for shelters where animals are viewable for adoption throughout their stay, the number of animals actively moving towards adoption. While this defines a physical space requirement at the low end, it is defined at the high end by the number of adoptions and the optimal length of stay.
- **Staff capacity for daily care:** this is the number of animals that can be adequately cared for, based on national and/or internal standards, on a daily basis. Even if

physical capacity is sufficient, staff capacity may limit the number that can be provided adequate care.

- **Staff capacity for flow through:** each animal will require specific services at several points during their shelter stay, e.g. intake, behavioral evaluation, spay/neuter surgery, and processing for reclaim, adoption, transfer or euthanasia. If staff capacity for flow through is inadequate for any of these points it can lead to a backlog that in turn creates problems with capacity in other areas.

Monthly daily averages

Although rough estimates can be obtained using annual numbers, it's generally helpful to look at capacity on a monthly basis. This is especially true for cats, which tend to be more seasonally variable than dogs, and in communities with substantial seasonal effects such as a large student or vacation population. Monthly daily averages (MDA) for intake and outcomes are obtained by obtained monthly totals (commonly available from all software systems), and dividing by the number of days in the month.

An example is given below (Table 1) of Monthly Daily Average Cat Intake, where the number in the final column is derived by dividing the number of cat intakes by the number of days in the month (column D = Column B/column C). If, like me, you have a hard time remembering the number of days in each month or just want to save a little hassle of typing in dates, you can simply use 30.5 for each month. You can see that in the example in Table 1 the annual average daily intake of 6 is quite a bit less than the peak daily intake of 11. If capacity is only sufficient for admission and subsequent flow through of 6 cats when almost twice that many are admitted daily, problems will undoubtedly ensue. On the other hand, from October through May five or fewer cats come in daily, less than half the peak number – for this shelter, it would be much more effective to triple feline intake and care staff for the busiest summer months rather than having the same staff level all year, which would sometimes be inadequate and sometimes excessive. If monthly estimates are simply not available, calculate annual averages instead and make an effort to estimate maximum intake and outcome by comparison (e.g. maybe intake for cats is about 2 times average at peak, so in the example below it would have been estimated at 12 if only the summary data were available).

A	B	C	D
Time period	Intake	Days in month	MDA
Jan-09	82	31	3
Feb-09	68	28	2
Mar-09	94	31	3
Apr-09	111	30	4
May-09	168	31	5
Jun-09	244	30	8
Jul-09	302	31	10
Aug-09	344	31	11
Sep-09	302	30	10
Oct-09	155	31	5
Nov-09	132	30	4
Dec-09	84	31	3
Total	2086	365	6

Table 1: Monthly daily averages

A caveat about averages

The calculations described here are based on averages, but even within a month there will be some variation. For most shelters, this is minor enough that averages are sufficient for planning. However, some shelters experience regular spikes: for instance, shelters that close two days in a row weekly can see a significant jump in intake the first day they are open again, or some shelters intermittently transfer animals in large groups from distant shelters. If you have daily data for each month, check this and see how much variation there is from the average. Don't worry so much about occasional spikes in intake, but if you see a regular pattern of days where intake is much greater than average, you may want to base your calculations on the maximum number coming in on peak days on a monthly basis, rather than monthly daily average. This will tend to overestimate daily needs but will ensure sufficient capacity to meet peak demand.

Actual and average daily population

In addition to intakes and outcomes, actual and average daily population (ADP) are needed in order to monitor and predict housing and staffing requirements for animal care. Population reports (often called "inventory" reports in shelter software) aren't always as readily available and easily manageable as intake and outcome reports. This is particularly true for historical daily population by age, species and area of the shelter (e.g. holding, adoption, isolation), which is needed for some of the calculations and graphs below. Of course, it's fairly easy – and highly advisable – to walk through the shelter each day and simply count the number of heads and paws in the building, but getting this into a spreadsheet for planning purposes will take an extra step. These are some options, depending on your software system. If you know of a better way, please let me know!

- For the most precise estimate, generate inventory reports for each day of the month, sum these and calculate the average. This is most practical when shelter software is available that readily provides historical daily inventory by species and location, and when these data are entered consistently by shelter staff.
- If daily inventory reports are not available, estimate daily population by spot-checking the daily population of animals in the shelter at intervals likely to be representative for the month. Choose a consistent date such as the second Wednesday of every month; select a date that is not immediately before or after events that lead to sudden dramatic changes in population, such as major weekend adoption events. This can either be done using a software generated report, or if this capacity is not available, start by recording a hand count on at least a monthly basis. Record by location, age and species.
- Monthly ADP can be estimated using intake and average length of stay reports. Multiply monthly intake by average length of stay for that month, then divide by the number of days in that month. This method is less accurate, since the length of stay data will apply in part to animals admitted the previous month that had an outcome during the current month, while the intake will apply for the current months. This method also doesn't give daily population by location but can at least give a rough idea of the number of animals present daily, which is considerably better than nothing.
- At minimum, for a shelter in which virtually all housing units are always occupied, counting the population on any given day (by age, species and area), or simply counting the number of housing units multiplied by the number of animals housed per unit will give a reasonable estimate of the daily population. However as capacity is understood, hopefully this will no longer be the case as the ideal rather than the maximum number of animals will be housed each day.

Required physical holding capacity

Now that you've got your monthly daily intake and outcome averages and some measure of daily population, you're ready to calculating. Since animals general start in holding areas of the shelter, we'll start there too with Required Physical Holding Capacity (RPHC). This refers to the number of housing units required to hold animals for any necessary period prior to making them available for adoption.

What is the "necessary holding period"?

To calculate RPHC you need to know the necessary holding period. Most commonly, this refers to stray holding but may also refer to other pre-adoption holding requirements. For instance, a shelter that routinely transfers animals in from another high risk shelter and holds them for a 14 day parvo quarantine would require sufficient physical holding capacity to carry this out. If holding periods are variable, calculate or estimate the average:

Example: Strays with ID are held ten days, strays without ID are held 5 days. You estimate (or know from your records) that 40% of dogs and 5% of cats come in with ID. So the average hold for dogs would be $0.4 \times 10 + 0.6 \times 5 = 7$, and for cats would be $0.05 \times 10 + 0.95 \times 5 = 5.25$ (so, basically, 5).

This method will result in a slight overestimate because some animals will have an outcome, such as reclaim by owner, before the end of the stray holding period. It's ok to overestimate a little since in reality animals are not always moved out of holding areas on the very day they become available. In addition, the "required" holding period can include a realistic estimate of an extra day or two to carry out needed procedures that can't be completed during the hold, e.g. if animals can't be spayed or neutered during the holding period and it takes a day to get this scheduled after the hold is completed, build this into the calculations below. However, extra time should be minimized – if there is more than a couple days delay of processes prior to releasing animals from hold, revisit whether these really need to be done prior to moving the animal along its way (e.g. perform spay/neuter surgery after moving the animal to adoption but before release to a new owner, if delays in surgery are causing a backlog in holding areas). If a procedure *does* need to be done before making the animal available for adoption – such as a behavior evaluation – either simplify the process or reschedule staff to ensure it can be done without delay.

Eventually, all animals will need an outcome and care for every step along the way. Delaying any step toward the final outcome only adds to the workload of *holding* (more animals to care for every day) without changing the workload for *flow through* (just as many needing intake, behavior eval, surgery, etc. each day). Just like paying off a credit card, putting off the process only adds to cost in the long run!

RPHC: the actual calculation

When monthly daily average intake and required holding period have been established, RPHC can be readily calculated:

$$\text{Required physical holding capacity (RPHC)} = \text{Monthly daily average intake} \times \text{required holding period}$$

Table 2 below builds on the MDA intake to show how RPHC is calculated using a spreadsheet, where column F is D x E. (The numbers don't exactly add up because rounded numbers are presented, while the calculations are made on the actual numbers.) Again in this real

life example for feline holding capacity, we see a dramatic seasonal fluctuation, where required capacity at peak is over 4 times that needed during the quieter months. When planning a shelter, always ensure sufficient capacity for peak populations.

A	B	C	D	E	F
Time period	Intake	Days in month	MDA intake	Intake holding period	RPHC
Jan-09	82	31	3	6	16
Feb-09	68	28	2	6	15
Mar-09	94	31	3	6	18
Apr-09	111	30	4	6	22
May-09	168	31	5	6	33
Jun-09	244	30	8	6	49
Jul-09	302	31	10	6	58
Aug-09	344	31	11	6	67
Sep-09	302	30	10	6	60
Oct-09	155	31	5	6	30
Nov-09	132	30	4	6	26
Dec-09	84	31	3	6	16

Table 2: Required Physical Holding Capacity (RPHC)

What is RPHC made of?

While the table above shows a nice, neat number for “required physical holding capacity”, this really defines how many “spots” for housing are required. A group kennel or room may provide 5 spots, while a single run provides space for only one adult but perhaps a litter of puppies or kittens. Thus the number of actual kennels or runs to meet RPHC depends both on the type of housing and the type of animal to be housed.

Accounting for age

The most common scenario in which one housing unit will provide multiple “spots” is for juvenile animals. Thus it is best to calculate the RPHC separately for juveniles and adults. If a good percentage of juveniles come in as litters (as is often the case with kittens, and sometimes for puppies), it is a safe bet that an average of at least 2 juveniles can be housed per unit. This is because some litters will be larger than 2, while some youngsters will come in individually and have to be singly housed. Therefore the number of cages/kennels required would be the RPHC/2. If separate housing is available for juveniles versus adults, you’re done. If juveniles and adults are housed in the same area, simply add the RPHC for adults to the RPHC/2 for juveniles to get the total number of housing units needed.

If the shelter you’re working with doesn’t collect data separately for juveniles versus adults, make an effort to estimate the number for each month. This applies to other calculations described below, such as adoption driven capacity and flow through staffing, as well. This was the case for the example given above. Table 3 below shows how an ‘age-adjusted intake’ can be estimated. In this example, it was estimated that all intakes from January – April were adults, and that all intakes over the April baseline were kittens (so column D = column B – column C). Adult and kitten MDA were calculated as before (column C/30.5 and column D/30.5 respectively). Adult RPHC is also the same, column F*6 (the holding period). Kitten RPHC was calculated as (column G/2)*6, since we assume 2 kittens per housing unit. Total RPHC then is simply the sum of adult and kitten RPHC and represents the total number of individual housing

units, e.g. cages or condos, required. There are simpler ways to combine these formulas, but I have done it “long hand” here in hopes it will clarify the underlying reasoning so you can adapt it to your own situation.

A	B	C	D	E	F	G	H	I
Time period	Intake	Estimated adults	Estimated kittens	Adult MDA intake	Adult RPHC	Kitten MDA intake	Kitten RPHC	Total RPHC
Jan-09	82	82	0	3	16	0	0	16
Feb-09	68	68	0	2	13	0	0	13
Mar-09	94	94	0	3	18	0	0	18
Apr-09	111	111	0	4	22	0	0	22
May-09	168	111	57	4	22	2	6	27
Jun-09	244	111	133	4	22	4	13	35
Jul-09	302	111	191	4	22	6	19	41
Aug-09	344	111	233	4	22	8	23	45
Sep-09	302	111	191	4	22	6	19	41
Oct-09	155	111	44	4	22	1	4	26
Nov-09	132	111	21	4	22	1	2	24
Dec-09	84	84	0	3	17	0	0	17

Table 3: Age adjusted holding capacity

Obviously this is a rough estimate, and may overestimate kittens in the summer and underestimate in the winter. You can evaluate your own shelter’s data more precisely based on experience, and fill in a number that seems like the appropriate balance of kittens versus adults for each month. If kittens are underestimated, RPHC will also be underestimated unless more than 2 kittens are housed per unit, and vice versa. This is one of many great reasons to prioritize collecting age specific data in shelters.

Comparing actual capacity, observed holding, and required physical capacity

It can be very helpful to compare required physical holding capacity with both actual capacity and the actual number of animals housed in holding. If RPHC regularly exceeds the actual number of housing units available, then crowding and the associated problems will be inevitable. Issues with cleaning, feeding, inaccurate behavior evaluation, missed medical diagnoses, frequent fights in group housing, etc. can all be symptomatic of insufficient housing capacity. Not only animals but staff are placed in a no-win situation: if there are not enough housing units to safely and appropriately hold animals for required holding periods, the only short term option is to house animals inappropriately and unsafely. In the medium term, this can be addressed (if possible) by shortening the required holding period, e.g. by limiting or speeding pre-adoption procedures as described above. In the long term, this must be addressed by providing additional humane housing or decreasing intake on an ongoing basis.

So what is actual capacity?

As with “necessary holding period” the answer to this is not as straightforward as it may seem. Just because 50 dogs can fit in 10 group runs, or 80 cats can fit in a room of 2’ by 2’ stainless steel boxes, does not mean this is sufficient, safe, adequate housing for this number of animals. Actual capacity should be based only on the number of units that meet humane standards for size and safety, whether for single animals, litters or groups.

In general, only single units are considered when defining actual capacity for holding, since animals should be housed individually until their health and behavior status is known.

Exceptions are bonded pairs that arrive together (provided housing is large enough), or individual litters of puppies or kittens as described above. Recently admitted animals may be incubating illnesses and often require at least a few days for vaccine protection to kick in. Therefore, holding housing needs to permit cleaning and care of animals without removal from the kennel or cage, as this creates excessive risks for exposure and transmission. This need can be met for dogs via individual “double-sided” runs separated by a guillotine door, and for cats by double-sided or compartmentalized cages or condos, or kennels of sufficient size that caregivers can walk in to provide for the cat’s daily needs.

While graphs can be generated that show the needed versus actual number of housing units that *don't* meet the requirements described above, be cautious about implying that these units are sufficient. It is not uncommon, sadly, to find a shelter in which none of the holding housing is really sufficient to provide for humane, safe care of all animals during the critical initial holding period. If graphs are generated showing apparently “sufficient” capacity, this unfortunate gap may never be addressed. While it can still be helpful to compare needed to actual housing units, I recommend at least including a heavy asterisk to indicate the number of “insufficient” units included in such calculations.

The graph below was generated from the RPHC calculated in table 3, with another column showing actual holding capacity of 30 individual cages. As in many shelters, the one in our example has a fixed number of housing units in spite of fluctuating requirements. Putting it in graphic form like this shows that there is plenty of housing except for a few months out of the year – but it just happens to be the time of year when the shelter will be most full of potentially highly adoptable kittens. Clearly sufficient housing for these vulnerable animals is a worthwhile investment. If the housing capacity can't be immediately increased, perhaps some kittens can be diverted directly to foster care for holding periods, or kept in their original homes until surgery can be scheduled and kittens placed directly up for adoption.

A	B	C
Time period	Total RPHC	Actual holding capacity
Jan-09	16	30
Feb-09	13	30
Mar-09	18	30
Apr-09	22	30
May-09	27	30
Jun-09	35	30
Jul-09	41	30
Aug-09	45	30
Sep-09	41	30
Oct-09	26	30
Nov-09	24	30
Dec-09	17	30

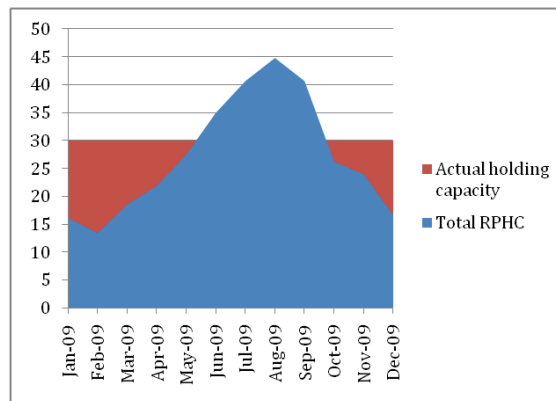


Table 4 and Figure : Comparison of required and actual holding capacity

If RPHC and actual capacity are very close, particularly rigorous attention needs to be paid to moving animals through very efficiently. If actual capacity greatly exceeds RPHC, consider whether some holding housing can be repurposed to better use, such as isolation, nursery or treatment areas. Some shelters have even converted excess dog housing into comfortable, humane and much needed cat housing.

RPHC versus observed number of animals and actual capacity

The actual number of animals in holding areas should be routinely compared to RPHC as well as actual humane holding capacity. It is not uncommon for us to calculate that the RPHC is

well within the actual capacity of a shelter, yet the shelter is substantially overcrowded. This is likely due to delays in decision making, hang ups in needed flow through services, or simply due to the tendency to fill all available areas to the point of bursting before taking action to move animals through. This is like waiting to pay on a credit card until late fees have been incurred, and should be strenuously avoided! Whatever measure you use to calculate monthly average daily population, described above, plot this on a regular basis against required holding capacity and the number of humane housing units. Even if your “monthly average daily population” is just a once-a-month spot check, keeping track of this important relationship and presenting it graphically can ensure that un-necessary crowding is recognized and quickly corrected.

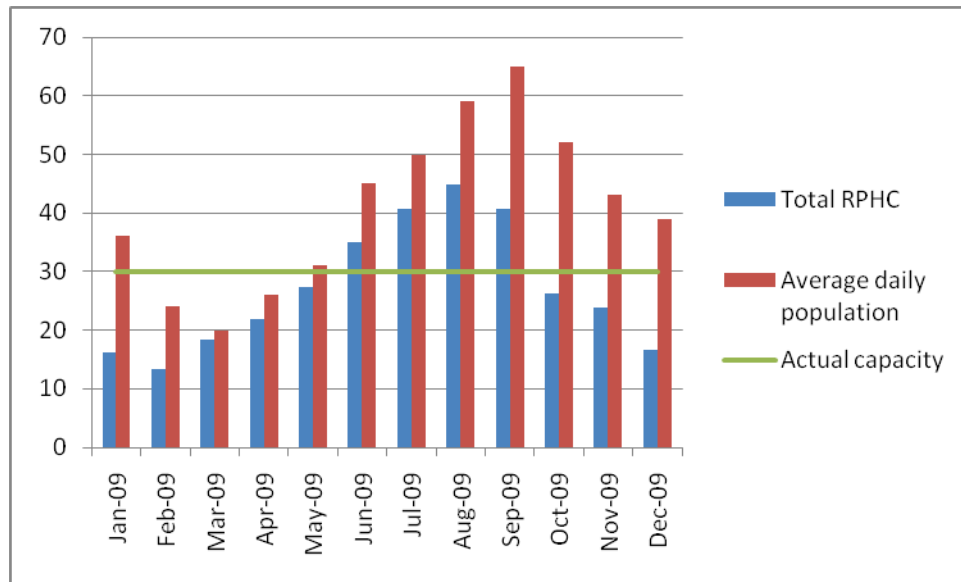


Figure 2: Required versus actual average daily population compared to actual capacity. In this shelter, the average daily population in the holding area exceeded the required holding capacity every month by at least a little and sometimes by over 50%. This indicates unplanned delays in moving animals along through the system. Even with the necessary length of stay, this shelter was going to be a little over capacity in the peak months, but prolonged stays led to being over capacity for an additional 4 months from October to January. This is often a consequence of having gotten a little behind in necessary procedures during the busiest season, which can carry over for several months if not corrected. Surprisingly often, holding areas can be emptied with just a few days of effort and overtime (sometimes starting with an adoption push so there is room to move adoptable animals out) and then kept within capacity on an ongoing basis.

Adoption driven capacity (ADC)

In a shelter that does not control intake, initial holding capacity is relatively straightforward to calculate: simply multiply the number of animals that happen to come in each day by the length of holding, as discussed above. For a shelter that limits intake, however, the question arises how much intake and housing capacity would be the right amount to optimize animal health, welfare and adoption. For limited intake organizations that place virtually all animals admitted, the number admitted will ultimately be dictated by the number of adoptions – although there can be some lag time while the shelter fills up, ultimately only as many as go out, can come in. If 10 animals are adopted each week, 10 animals can be admitted each week on an ongoing basis. But how many should be held within the shelter in between admission and adoption?

To make this question more clear, imagine starting with an empty shelter where an average of 10 animals a week will be adopted. If this shelter has room for 50 animals, then 20 could be admitted weekly for 5 weeks, 10 more per week than are adopted. Or 50 could be admitted on the very first day, or 11 per week for 50 weeks. At some point, though, the shelter will be full and intake and adoptions will have to remain symmetrical at 10 per week. After that point is reached more than 10 animals weekly can be admitted only if more than 10 are adopted out. With 50 animals in the building “in line” for adoption, the chances for each animal to be adopted in any given week will be 1 in 5, and the average length of stay is guaranteed to be 5 weeks per animal. The same dynamic applies to the size of adoption areas within open intake shelters: if 20 animals are placed “up for adoption” and 10 animals are adopted out each week in an adoption area holding 50 animals, the area will become full after 5 weeks and another outcome will befall the number of animals placed up for adoption in excess of the number of adoptions.

So the question for our hypothetical shelter or adoption area is: what is the right number to have on track for adoption? Could the shelter adopt out more animals if they held 100 at once instead of 50, or would this double their daily costs and only delay by a few weeks or months the point at which intake will need to balance out with adoptions? If they dropped to housing only 25 animals for adoption, would they benefit from reduced costs and an average length of stay of only 2.5 weeks, or would they see adoptions drop because of insufficient selection or insufficient time for animals to connect with the right adopter?

Clearly these are important questions: too many animals for adoption and costs and length of stay are needlessly increased, too few and adoption numbers will be compromised. This is further complicated by the fact that length of stay is not neutral for shelter animals. Some animals will benefit from the opportunity to stay longer in the shelter: this includes those that will receive active treatment or rehabilitation to make them more adoptable or those that have a unique condition (e.g. very large dogs, animals with conditions requiring special care) that makes them suited for a limited number of homes that come along relatively rarely. However, for the vast majority of animals that enter the shelter healthy, friendly and immediately suitable for adoption into a typical home, increased length of stay tends to be detrimental rather than beneficial. The risk to health associated with longer stays in the shelter has been described above. Illness contributes to yet longer stays – a detour within the shelter system with no benefit towards improved chances for adoption and increased challenges in maintaining behavioral well being. An animal that is depressed or develops stereotypic behavior from prolonged confinement sees its chances for adoption further decrease.

We also know the number and presentation of animals for adoption will have a direct impact on the likelihood of adoption for each one. While “saving a life” is commonly cited as a primary motivator for adoption of a shelter pet, we also know that most adopters want healthy, friendly animals[6, 7]. Presenting animals in a way that highlights their personalities and provides adopters with information is likely to increase the overall number of adoptions. Conversely, research on selection of everything from gourmet chocolates to potential mates suggests that too many choices will have a detrimental or even paralyzing effect on the ability to choose. We’ve probably all had this experience at one time or another – whether shopping for salad dressing or cell phone plans, a dazzling array of choices can become simply overwhelming.

So after all this discussion, what is the elusive “right number”? Fortunately it turns out not to be all that complex in most cases. For most organizations, the ideal number of animals for adoption, or “Adoption Driven Capacity” (ADC) is calculated by determining the target average length of stay, and multiplying that by the monthly daily average number of adoptions. For animals basically “ready to go” upon admission (old enough and not requiring any treatment or rehab other than the usual vaccines, spay/neuter and other wellness care), the total length of stay

should generally be about 2 weeks. If animals are held for stray or quarantine in areas where they can be viewed and selected for adoption, this total time can be included when calculating ADC with a goal of ~ 14 days total in holding and adoption (so for example if the time in stray hold is 7 days, the target time in adoption would be ~ 7 days). If holding areas are cut off from public view, the target average length of stay in adoption should generally be at least 10 days to be viewed for adoption (to span two weekends, if that is the time of peak adoptions).

$$\text{Adoption Driven Capacity} = \text{Target Average Length of Stay} * \text{Monthly Daily Average Adoptions}$$

A	B	C
Time period	MDA adoptions	Adoption driven capacity
Jan-09	2	14
Feb-09	2	17
Mar-09	3	21
Apr-09	4	26
May-09	5	38
Jun-09	6	42
Jul-09	6	42
Aug-09	8	56
Sep-09	6	42
Oct-09	5	35
Nov-09	4	31
Dec-09	3	19

Table 5: Adoption driven capacity calculation, where column C = Column B * 7 days target length of stay in adoption (this would be for a shelter where animals were also available for a 7 day stray hold, resulting in an overall average length of stay of 2 weeks).

As for required physical holding capacity, consideration must be given to age and species when determining the number of housing units required to meet ADC. In addition to housing requirements, adoption rates may differ substantially by age. In the example in Table 5 an overall ADC for cats has been calculated using daily combined adoptions for cats and kittens. However, if the 8 adoptions a day during the peak month of August break down to 7 kittens and 1 adult cat, but adoption contains half and half kittens and adults (21 of each), a third of the kittens would have to be adopted each day to meet demand – and the shelter risks running out if there is any delay in keeping enough kittens moving through, while each adult will stay an average of 21 days.

Of course, most of the time we are not starting with a fresh, empty shelter and a hypothetical adoption rate, but rather an adoption area with however many housing units we happen to have holding a variety of hopeful animals awaiting homes. Using average daily population by location, you can visually demonstrate over time the difference between the number of animals actually present in the adoption area compared to ADC. If historical data are not available, you can begin by simply going out and counting on any given day, and tracking the number going forward.

If you find the number of animals in adoption often falls below ADC, consider whether this reflects a highly successful adoption program, insufficient flow through or an adoption area

that is just too small. If the issue is simply that animals are flying out of adoption in less than your target length of stay, then this is cause for congratulations rather than concern. If, however, animals are backed up in holding while potential adopters wander sadly through empty adoption areas, look to flow-through staffing capacity (see below) and correct delays in moving animals through the system. If adoption areas are simply too small and/or staffing is sporadically insufficient to keep animals moving through, consider making animals in holding available for adoption throughout their stay while you work towards long term solutions to housing and staffing issues.

If the number of animals awaiting adoption is well above ADC, recognize that the most important factor in correcting this situation will be moving extra animals through for a while, then maintaining ADC in the future. The number of animals for adoption tends to be a self-sustaining situation: remember in the example we began with of the shelter that took in 50 more animals than they placed until they were full, then had to maintain the same number coming in as going out with the length of stay set at five weeks. The same situation can play out in reverse in a similarly short time frame. Let's say this shelter decided they wanted each animal to stay only a month and that 30 animals would provide a sufficient variety at that location. Just as they started by adding 50 more than were adopted out, now they will need to adopt out 20 more than are added. This can be done with one big adoption push or gradually by adopting out just one or two more a week than previously until a new balance is reached. For cats, this is often easiest accomplished in the winter when intake is relatively low. The important thing is, once ADC is reached, it must be sustained by letting adoptions determine the number of animals added, rather than simply adding more because more came in the door. Develop alternate housing and foster programs to manage sudden influxes or temporary imbalances between intake and live release so that animals will not be needlessly euthanized or turned away.

One risk of determining and maintaining capacity is that we sometimes use crowding as the main trigger for adoption events, or for saying "enough for now" at limited intake shelters. If crowding doesn't occur because a healthy capacity is maintained, don't forget to still hold these promotions! Plan ahead for adoption events at times of year you know demand upon the shelter will increase (based on historical data). Better yet, don't wait for any crisis, but throughout the year take advantage of opportunities to promote adoptions in association with holidays or other events within your community. Likewise for individual animals, don't wait until they've been in the shelter for weeks or months to take special promotion measures. Identify animals that may need a special kind of home early on and invest in individual promotions. The good thing about ADC is that there is little risk of running out of pets – if adoptions increase, the worst that will happen is that average length of stay will decrease. If adoptions consistently increase such that you find yourself running out of animals, most shelters will have little difficulty increasing intake or transfer to meet the increased demand.

One caveat about adoption driven capacity is that if ADC is very small because the rate of adoption is very low (overall or for any species/age group), ideally still keep a minimum number of animals to provide a reasonable variety available at all times. For instance, as shelter that only adopts out 1 dog a week would calculate an ADP of 2 at most. Clearly more variety of dogs of different breed mixes, sizes, temperaments and the like will be likely to increase the number of adoptions at this shelter. In this situation, make the reverse calculation from ADC by dividing the number of animals for adoption by the number of daily or weekly adoptions: say this shelter decided to hold 20 dogs for adoption at once. If 1 is adopted out per week, each dog will stay an average of 20 weeks, and housing and care must be planned accordingly to ensure humane conditions for the duration of each animal's stay.

Staff capacity for daily care

With required physical holding capacity and adoption driven capacity in hand, you have a basic estimate of the number of animals the shelter must be able to hold, on average, at any given time to serve the population optimally (with the addition of animals in treatment, rabies quarantine or other specific areas). However, we know there is much more to providing humane conditions than giving the animal a place to physically reside. Animals need both daily and “flow through” care to move successfully through the shelter.

At the most basic level, sufficient time for daily care must be available to provide for the daily cleaning, feeding, any needed medical care and monitoring of each animal. (Throughout this document, when I say staff, I include skilled, reliable volunteers that can be counted on for daily care activities.) Required staff capacity for daily care is calculated by multiplying the number of animals present on a daily basis by the number of minutes required for basic care per animal per day:

$$\text{Required Staff for Daily Care} = \text{Minutes per animal} * \text{average daily population}/60 \text{ to give the number of hours required for care.}$$

The inverse can also be calculated: Staff Capacity for Daily Care is calculated by dividing the number of staff minutes available for basic care activities per day by the number of minutes required per animal, to get the total number of animals that can be humanely cared for at any one time.

$$\text{Staff Capacity for Daily Care (SCDC)} = \text{Minutes of daily staff time for care}/\text{minutes required per animal per day}$$

So, how many minutes per animal per day are required?

As with the definition of “adequate housing units” this number can vary by species, age and housing type. It will also vary depending on the needs of the population – a shelter that has mostly healthy juveniles and adults can plan to spend fewer minutes on basic care per day than one with the same number of bottle babies or animals with significant medical or behavioral rehabilitation needs. As a general guideline, NACA and HSUS recommend allocating 15 minutes per animal per day for basic cleaning and feeding. You may want to time a qualified staff person performing their duties according to acceptable protocols in order to get a time per animal that seems to be a good fit. As with holding capacity, you may find that different species and ages require different amounts of time; for instance, a litter of 5 kittens may take only twice as long as a single adult cat to clean and feed. Thus, species and age specific calculations are helpful, or if this level of data is not available, calculate an average per animal based on the proportion present in the population (see example of stray animals with and without ID given above).

This could also be a good time for a staff/stakeholder discussion of just how much time a shelter animal “should” receive each day. It’s surprising how much we tend to skimp on this, hoping that an animal can be checked out for signs of illness or stress, cleaned, fed, appropriately monitored and receive a bit of friendly interaction in a very few minutes per day. As with providing sufficient housing, providing sufficient daily time for care may seem daunting if much less has been the norm. But, if you never set your sights on this goal and define the gap, you certainly won’t get there. Once defined, creative solutions are more likely to become apparent. As with physical capacity, it’s often helpful – and sometimes shocking - to graphically demonstrate the relationship between actual staff time, required staff capacity, daily population, and average amount of time to care for each animal.

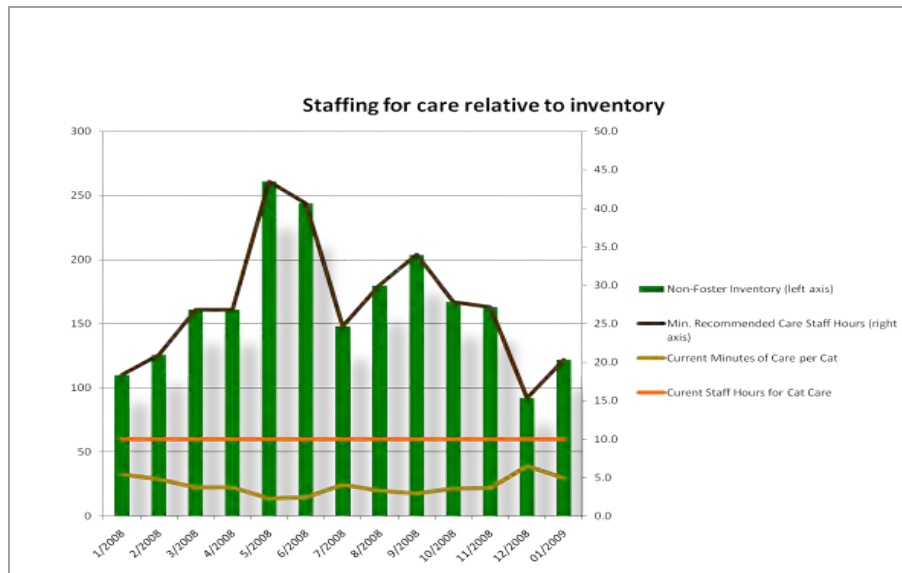


Figure 3: This graph shows the relationship between actual staff hours for care (the orange line, which stayed steady throughout the year), required staff hours for care based on acceptable standards (the dark blue line, right axis, which fluctuated with the population and was between twice and over four times what was actually available), and monthly daily average population (left axis). The sad olive line shows the actual minutes of care each animal received, which dropped as low as just about 2.5 minutes per day during peak season, or 180 seconds to clean, feed and monitor a living animal.

If the actual daily population exceed the Staff Capacity for Daily Care, failures in care will be nearly inevitable. As with insufficient housing, this tends to create a vicious cycle – animal health suffers due to lapses in care, sick animals have greater care needs and stay longer, this leads to more animals in the shelter each day, overwhelmed staff can't keep up with moving animals through the system as they scramble to just stay on top of feeding and cleaning, and the cycle continues. If the actual daily population reflects the calculated required holding capacity and adoption driven capacity, this desperate situation is built into the system and must be corrected by increasing staff or skilled volunteers or investing in housing that requires less daily time (e.g. double sided guillotine separated runs which are substantially quicker to clean than single housing). If the actual population is greater than required physical holding plus adoption driven capacity, the situation is better remedied by investing in quicker flow-through to reduce the number of animals in the building and improve the health and welfare of all concerned. *Which brings us to our next topic, staff capacity for flow through.*

Staff capacity for flow through

Even if physical and staff capacity for daily care are theoretically sufficient, insufficient staffing for even a single necessary step to move animals through the system can create a bottleneck that impacts every single other area. If there are not enough trained staff to complete behavioral evaluations on a daily basis, for example, dogs will linger in holding areas awaiting this next step along their way. This increases the daily population in holding, which increases daily care needs, leads to crowding in the holding area, increased risk of disease, longer lengths of stay... a familiar frustrating cycle in which some dogs will likely deteriorate in health and behavior by the time they finally do get evaluated. Lack of time to complete a 20 minute

assessment on the day it was due can lead to hours of extra costs in daily care, treatment and ultimately even needless death of shelter animals. *It is never cost effective to under-staff flow through points.*

So what are the “flow through points” we need to be concerned about? A flow through point is anything that needs to happen for an animal to enter, move through and exit the shelter. Of course every animal will have an intake and an outcome, and some will go through additional steps (depending on the shelter’s individual policies) which might include: Spay/Neuter surgery, Behavioral Evaluation, Pre-adoption Testing (e.g. for FeLV/FIV or heartworm), and Move to Adoption.

The simplest flow-through staffing requirement is for Intake: all animals will need to be processed for admission and the time required for this can be easily defined by observation. For each process, observe at least 10 instances and calculate the average. Let’s say you observe adult feline intake and determine the process takes 15 minutes (including entering data into the computer, examining the cat, providing vaccines and parasite control, placing the cat into a fresh clean cage and providing food and water). Staffing for intake, therefore, is easily defined:

$$\text{Average daily staff hours required for intake} = \text{Minutes per intake}/60 * \text{MDA intake \#}$$

Using the MDA intake table we generated earlier, this can be calculated on a monthly basis:

A	B	C
Time period	MDA intake	Hours of staff time required
Jan-09	3	0.7
Feb-09	2	0.6
Mar-09	3	0.8
Apr-09	4	0.9
May-09	5	1.4
Jun-09	8	2.0
Jul-09	10	2.4
Aug-09	11	2.8
Sep-09	10	2.5
Oct-09	5	1.3
Nov-09	4	1.1
Dec-09	3	0.7

Table 5: calculating hours of staff time required for intake on a daily basis each month, where Column C is calculated as Column B*15/60.

Likewise all animals will have an outcome (e.g. reclaim, transfer, adoption, euthanasia). While not all outcomes will be the same, the number of animals receiving each outcome is readily available from most shelter databases, and Monthly Daily Averages and time to complete each Outcome can be determined exactly as for intake. Intermediate steps, such as Behavior Evaluation or Spay/neuter surgery, are slightly more complicated if not all animals receive the same services. At the most basic level, subtract the average daily number of reclaims from the average daily intake to establish the number of animals requiring additional services beyond initial holding. These steps often have to do with evaluating and preparing animals for adoption.

For some shelters, some services will be performed for virtually all animals not reclaimed. For instance, all adult dogs may receive a behavior evaluation before any decision is made regarding adoption, transfer or euthanasia. Other services, such as spay/neuter surgery or pre-adoption health testing will only be performed for a certain subset, such as intact animals or those passing a behavior evaluation.

The exact details of calculating the number of animals requiring these intermediate steps is beyond the scope of these notes but a few hints will be given here. At a shelter where virtually all animals not reclaimed by their owners are adopted, the average daily number of pre-adoption processing steps will be about equal to the Monthly Daily Average adoptions. For shelters where a substantial fraction of animals placed for adoption end up with another outcome, such as rescue or euthanasia, make an estimate of this (or determine the exact figure from your records if available) and add it to the MDA adoption. For instance, if about 25% of animal put up for adoption end up with another outcome, multiply MDA by 1.25 for the number of animals needing procedures each day before movement to adoption. Similar adjustments can be made to estimate what percentage of animals will need other flow through procedures. A detailed example of calculating spay/neuter surgery requirements is provided in Appendix A (thanks to Dr. Sandra Newbury). Stacked graphs can be generated to visually demonstrate required staffing levels. As with capacity for daily care, this can help identify where there is risk for delays. If only certain staff can provide particular services, these should be graphed and evaluated separately (e.g. time for spay/neuter surgery will require a certain amount of veterinary and technician time, while intake, behavioral evaluation, health testing and euthanasia may only be performed by certain trained staff members).

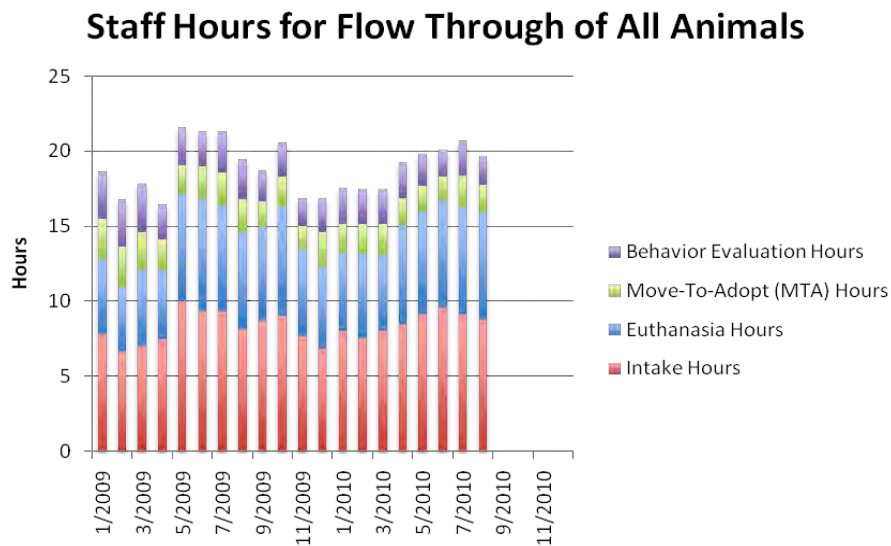


Figure 4: This graph shows a summary of required staff for flow through of all animals through one large municipal shelter. While the hours per process should be calculated separately for each species, it is useful to combine them into a summary graph such as this one if the same staff are responsible for all processes. For example, only dogs received behavior evaluations at this shelter, but the time for that was combined with the time for intake, movement to adoption areas, and euthanasia of all species since these duties fell to the same staff members.

If staffing for flow through cannot be provided, then these steps must be shortened or eliminated, or the number of animals requiring these services reduced by decreasing intake. Backlogging animals awaiting some magical day when staff will have time to catch up is simply

untenable. As with all other areas discussed, bringing the population within capacity at this and every step along the way works synergistically to ensure the quickest, safest path for each animal from the time it enters your care to the moment it leaves.

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Appendix A: Spay / neuter capacity requirements

Spay/ Neuter capacity describes the ability to accomplish a number of surgeries given the staffing, facility, and time allotted. Requirements for this capacity are based on animal flow-through numbers with an estimate of how many animals would require surgery prior to release.

As an example, average daily adoptions can be used to roughly estimate the need for spay/neuter surgery. To get the most accurate picture, an estimate of what percentage of both dogs and cats who are selected for adoption arrive at the shelter intact versus previously altered is required. For this example, we will assume that all adopted pets need surgery prior to adoption, which is most likely an overestimate.

The most powerful and accessible preventive program is likely associated with spay/neuter outreach to the community to decrease the birth and subsequent surrender of unwanted litters. So, although the number of adoption-associated surgeries may be overestimated in the following example, an increase in overall spay/neuter capacity even greater than that represented by these numbers may be required to meet community goals.

Spay / Neuter Surgery Number Requirements

In order to calculate spay/neuter surgery staffing needs, it is necessary to multiply the veterinary and technician time required per surgery by the expected number of animals requiring this procedure on a per-surgery-day basis. Time calculations should include the veterinary and technician time required to accomplish every aspect of the procedure, including identification of surgical candidates, pre-surgical exams, preparation and recovery, the surgery itself, paperwork/documentation associated with surgery and logging of controlled substances, communication/release to new adopters, and any follow up care required after release. The expected number of required procedures for a shelter that performs surgery post-adoption can be

calculated by estimating the number of expected adoptions by the fraction of animals that are intact at the time they are selected for adoption. Any additional procedures – such as spay/neuter prior to rescue, reclaim by owners, or release to feral cat colonies – will also have to be included in the estimate. The following calculations provide an estimate of expected adoption numbers only.

Daily surgery numbers and types required can be estimated by the monthly adoption number expectations (based on the previous year) for cats, kittens puppies and dogs divided by the number of surgery days in the month.

As an example:

This example assumes 100% of adopted or rescued animals would require spay / neuter. That is likely an overestimate because some animals may arrive previously altered. It is unknown what fraction. If the fraction of animals who are selected for adoption arrive unaltered is estimated, those numbers could easily be subtracted from these overestimates.

This example assumes 496 cats would require surgery in June.

If surgery is done four days a week and there are 4 weeks in the month (16 surgery days), then 31 feline surgeries must be performed each surgery day.

496 feline surgeries / (16 surgery days) = 31 feline surgeries required each surgery day

Canine surgery needs could be similarly estimated and should be added to the total numbers. If on average, approximately 132 dogs are adopted each month, there would be a slightly overestimated need for surgery for 8-9 dogs per surgery day.

132 canine surgeries / (16 surgery days) = 8 canine surgeries required each surgery day

Timing for all aspects of the spay / neuter process should be timed or estimated and added to the surgery time in order to estimate overall staffing and facilities needs.



Housing for Health, Wellness and Success: Standards for Facility Design and Environment

Kate Hurley

UC Davis Koret Shelter Medicine Program

www.sheltermedicine.com

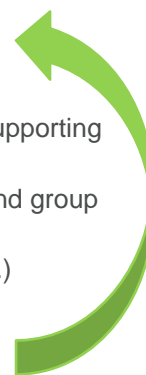
www.facebook.com/sheltermedicine



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What is a healthy environment made of?

- Community
 - Shelter facility
 - What (intake, holding, adoption, special needs, supporting areas) and how many (housing units)
 - Primary enclosures within areas (individual and group housing)
 - » Stuff (beds, litter, toys, other animals, etc.)
 - Animals interacting with the stuff
 - People interacting with animals



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Part One:

THE PRIMARY ENCLOSURE AND WHAT'S IN IT



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Does size matter? The effect of cage size on the expression of normal behaviors in shelter cats

UC DAVIS VETERINARY MEDICINE Sharon Ostermann, BA, Denae Wagner, DVM, MPVM, Kate Hurley, DVM, MPVM

Introduction
Housing has been demonstrated to have an effect on health, stress levels, and recovery from illness in many species of animals. Studies in dogs, rodents, and primates have shown that increased space and enrichment for the animals leads to an increase in activity and enrichment for the animals. In cats, an increase in space and enrichment has been shown to lead to an increase in activity and enrichment for the animals. In cats, an increase in space and enrichment has been shown to lead to an increase in activity and enrichment for the animals.

Materials and Methods
The study took place in an open-space municipal shelter. Nine cats were provided in this study, eight in the large cage and one in the small cage. All cats were 8 days or older and had been spayed or neutered. The housing history of the cats was not recorded. All cats were housed in the same type of cage. The study was conducted in a shelter that had been designed to house cats in a humane and safe manner. The study was conducted in a shelter that had been designed to house cats in a humane and safe manner.

Results
Cats in larger cages engaged in more exploratory behaviors, such as walking, drinking, and grooming, compared to the cat housed in the smaller cage. The cat in the smaller cage engaged in more exploratory behaviors, such as walking, drinking, and grooming, compared to the cat housed in the larger cage. The cat in the smaller cage engaged in more exploratory behaviors, such as walking, drinking, and grooming, compared to the cat housed in the larger cage.

Although there is limited data regarding enrichment cages, cats that are housed in cages that are smaller than the minimum recommended size for cats are more likely to exhibit signs of stress and depression. In addition, cats housed in smaller cages are more likely to exhibit signs of stress and depression. In addition, cats housed in smaller cages are more likely to exhibit signs of stress and depression. In addition, cats housed in smaller cages are more likely to exhibit signs of stress and depression.



Limitations:
The study was limited by the number of cats that were available for the study. The study was limited by the number of cats that were available for the study. The study was limited by the number of cats that were available for the study. The study was limited by the number of cats that were available for the study.

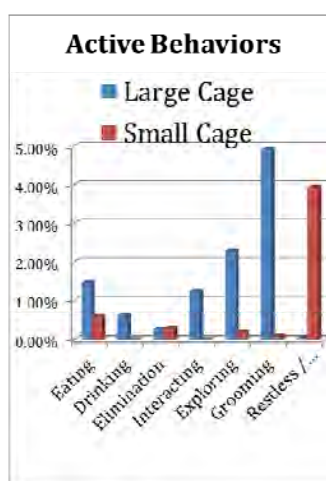
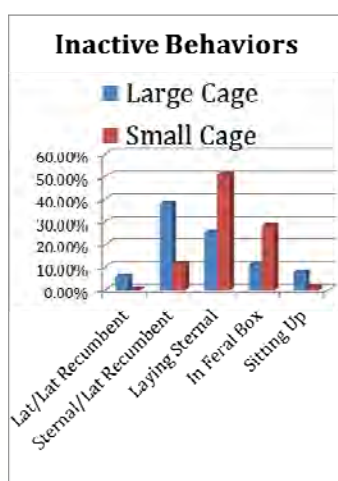
Size matters!

- “Primary enclosures must provide sufficient space to allow each animal, regardless of species, to make normal postural adjustments,
 - e.g., to turn freely and to easily stand, sit, stretch, move their head, without touching the top of the enclosure, lie in a comfortable position with limbs extended, move about and assume a comfortable posture for feeding, drinking, urinating and defecating
 - In addition, cats and dogs should be able to hold their tails erect when in a normal standing position.”



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Effect of cage size on behavior



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Effect of cage size on health

all_URI_GT2	IRR	Robust Std. Err.	z	P> z	[95% Conf. Interval]	
new_cifs_2	.8466349	.1243785	-1.13	0.257	.6348145	1.129134
new_cifs_3	.4896522	.0598454	-5.84	0.000	.3853484	.6221882
mixed	.3275651	.1583542	-2.31	0.021	.1269998	.844875
ln_total_cage	1.179146	.3084261	0.63	0.529	.7061895	1.968857
Movement_1-w	.1891859	.0390889	-8.06	0.000	.1261876	.2836357
Intranasal+e	1.463807	.3018267	1.85	0.065	.9771741	2.192782
new_hs_2	1.050598	.4976885	0.10	0.917	.415151	2.658687
new_hs_3	.7965236	.2267483	-0.80	0.424	.4559162	1.391593
new_season_2	.722167	.0468721	-5.02	0.000	.6359025	.8201339
new_season_3	.7874888	.0896001	-2.10	0.036	.6300792	.9842234
new_season_4	.9176195	.1682131	-0.47	0.639	.640656	1.314318
Total_heal+e (exposure)						

Greater than 9 square feet of floor space
but not 6-8 compared to < 6
Limited movement in first 7 days



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What is sufficient space for a cat?

- At least 28 - 30 inches high
- 11 square feet of floor space better than 7.5
- Greater than 9' better than 6-8' (unpublished data)
- At least 28" by 30" cat sized clear space (diagonal 41" will allow most cats to lay full length)



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Cost effective choices



Sheltermedicine.com, search "PVC portal"



www.fieldhaven.com



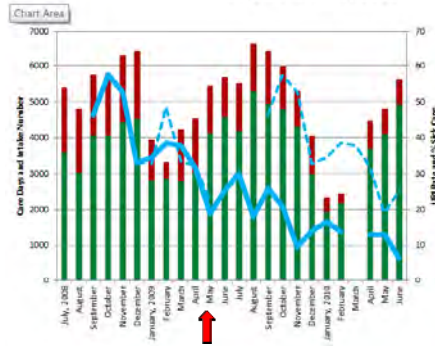
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Cost of housing



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URI before and after



Average decrease in monthly sick care days: 29%
 1,132 fewer sick days summer after versus before



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Value of 1,132 fewer days of sick cat care?

Daily Care Cost Sick- URI		% cats receiving	
Treat in House			
Initial Cost (one time costs)			
Processing from gen. pop by staff(min)	5		
Return to gen pop by staff(min)	5	80	%
Veterinary (min)	5		
1x housing needs			
Paper/Misc			
Treatment Antibiotic	\$2.00	100	%
Treatment Other	\$1.00	35	%
Initial one time in house treatment cost/cat			\$8.35
Daily Sick Care Costs			
Daily Cost Healthy Cat	\$30.63		
Sick Care by staff(min)	5	80	%
Sick Care by vet(min)	5	33	%
Daily Sick Care Costs/cat			\$32.86
Average Days of Illness Care		10	Days
Ave. Total Cost of URI Care/cat			\$336.98



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What is sufficient space for a dog?

- Sufficient for activities and content
 - Bed and food for each dog
 - Separate from elimination
 - Space for several steps
 - *Kennels are not crates*
- Tall enough for dog to stand on rear legs
- Ideally tall enough for human entry



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Set-up matters

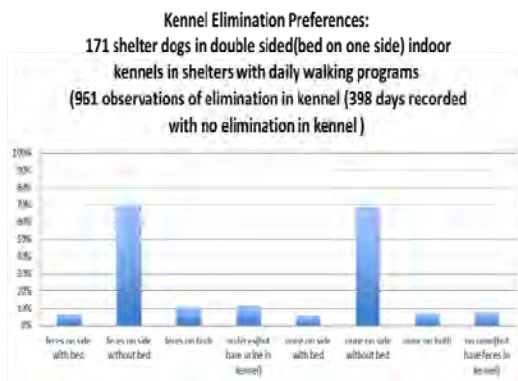
- “Enclosures that permit care and cleaning without removal of the animals (e.g., double-sided or compartmentalized enclosures)... should be provided for recently admitted or ill animals and those who are younger than 20 weeks of age.
- A primary enclosure must allow animals to sit, sleep and eat away from areas of their enclosures where they defecate and urinate.”



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The importance of compartments

- Cleaning and care without removal
- Stress reduction
- Disease control
- Safety of animals and staff
- Time savings
- Reduced chemical use
- Separation of poop and beds



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If you don't already have compartments



Figure 6-Multi-purpose Side Access Kennels

Swattmiersarchitects.com

- Portals for cat cages
- Back to back or side to side openings for dog kennels
 - With guillotine doors ideal for cleaning
- Crate within a kennel/cage
 - Only if size is sufficient
- Two kennels per animal
 - Across aisle preferable to side-by-side



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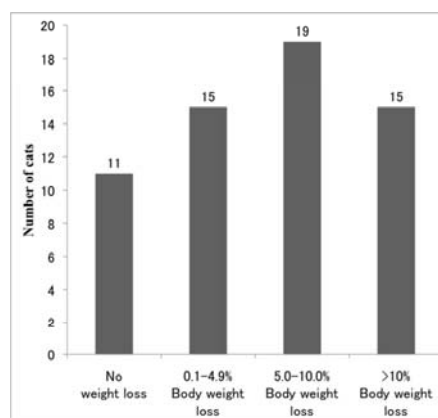
What's wrong with this picture?



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Setting up for success

- “Less than 2 feet of triangulated distance between litterbox, resting place and feeding area has been shown to adversely affect food intake for cats.”



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Setting up for success

- Photograph and post correct cage set up
 - Maximize distance between food/bed and elimination
 - Elevated (door mounted) food and water dish holders
 - Inserts to contain litter if cage size permits
 - Sufficient height above litter to posture normally



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True or False?

Visual exposure to other dogs has been shown to increase barking.

Use the buttons on the right side of the screen to answer.



Click for **TRUE**

Click for **FALSE**



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Visual choices

- Primary enclosures should allow animals to see out but should also provide at least some opportunity to avoid visual contact with other animals.



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Visual choices

- Double sided runs give choices
- Avoid blank walls
- Angled runs for dogs?
- Partial cage covers for cats
 - Visual barriers don't tend to work for dogs
- Traffic flow and individual animal placement for dogs
- Window/outdoor view where possible



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Aiming high

- “Elevated resting places should be provided whenever possible, as long as this would not restrict animal movement within the enclosure.”
- Cats must have places to hide (e.g., paper bag or box large enough to provide concealment) and should have high points to perch upon.”



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Hiding places in small, small spaces



www.sheltermedicine.com , “elevated bed”

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Might go without saying, but...

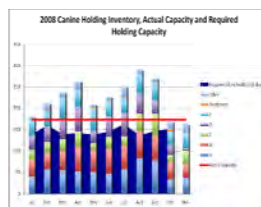
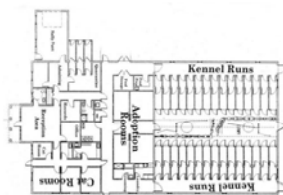
- “Cats must have a litterbox large enough to comfortably accommodate their entire body”



3” high by 12” wide by 15” deep for *most* cats with adequate height above



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Part Two:

THE SHELTER FACILITY: WHAT AND HOW MANY?



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The overall facility

- “The design should provide for proper separation of animals by: health status, age, gender, species, temperament, predator–prey status
- Facilities must be appropriate for the species, the number of animals receiving care and the expected length of stay in order to ensure physical and psychological wellbeing of the animals.”



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Right-sizing the facility

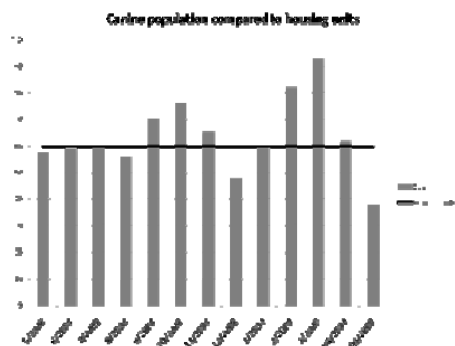
- Number of animals housed determines:
 - Daily care cost
 - Staffing requirement
 - Length of stay
 - Single greatest risk factor for illness
 - Risk factor for behavioral deterioration
 - Risk factor for non-adoption
- Too many or too few *will cost lives*



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How much pre-adoption housing is enough?

- Monthly daily average intake (MDAI)
- Pre-adoption holding time
 - Stray period
 - Required pre-adoption procedures
 - Waiting for rescue
- Required housing = $\text{MDAI} \times \text{holding time}$
- Aim for 80% capacity most of the time



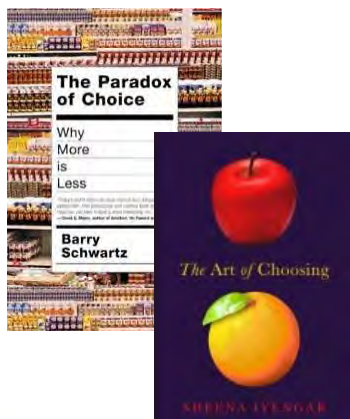
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How much adoption housing is enough?



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More is not always better



Dating Study Says Singles With Options Go For Hotties

by KYLE HILGERSBERG

Listen to the Story

April 19, 2010

Scientists already know people's brains can be overwhelmed by choice, say when shopping for electronics, detergent — even chocolate. Too many options can lead to much confusion, often followed by inferior or snap judgments.

Psychologist Alison Lenton wanted to find out if the same psychological state of being overwhelmed happens when we're choosing people — like someone to date. Lenton, who studies experimental social psychology at the University of Edinburgh, and economist Marco Francesconi of the University of Essex, decided to study this by looking at speed dating.



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Adoption driven capacity

- Monthly daily average adoptions x ~ 7-10
- Age, +/- breed, condition specific
- Minimum to provide some variety
- Comfortable, cheap long term holding options to address predictable fluctuations



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Right sizing adoption

- “Our number of cages is 24 in the cat room. Last year we adopted out 232 adult cats from Oct 2009 to Mar 12, 2010 and kept the room pretty much at capacity.”
- ADC in adoption area = Average daily adoptions x 7-10
- $232/163$ (# of days in the time period) = 1.4 adoptions per day
- $1.4 \times 7 = 10$, $1.4 \times 10 = 14$
- ADC = 10-14



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Right sizing adoption

- “In Oct 2010, we decreased our cat numbers to 12-13 by giving them double space. Our adoptions from Oct 2010 to present are now 261...29 more than last year of the same time frame. The cats are less stressed, URI is non-existent right now.”

Nice!!!



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Try this at home!

The screenshot shows the ASVET website interface. At the top, there is a navigation bar with links for HOME, ABOUT US, SERVICES, SHelters & Health Centers, EDUCATION, and RESOURCES. A search bar contains the text 'Calculating shelter capacity'. Below the search bar, there is a section titled 'Calculating shelter capacity' with a 'View PDF' link. To the left, there is a 'Become a Member' section with a photo of people and text about membership benefits. To the right, there is a 'Related Resources' section with a link to 'DRO-511 PDAYS!'. At the bottom, there is a footer with a grid of links for various services and programs, and a logo for the Association of Shelter Veterinarians.



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Case study: Feline Housing at the Chemung County Humane Society and SPCA



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Making a change

- Repurposed rooms
- Re-used best of existing cages
- Low cost solutions for additional housing
- Total cost: ~ \$10,000



Multipurpose grooming/utility room moves into the hallway



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Old "multipurpose room" becomes new intake room



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Low cost, high quality housing

- Remember adoption driven capacity
- Small, airy group pens
- Double sided laminate condos for youngsters



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Meeting cats' needs



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Meeting human needs too



<http://www.youtube.com/watch?v=aSgBRlqdgTw>



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Other Resources



- www.sheltermedicine.com, search “housing”, type information sheet
- Check out all the links on the right for many more resources



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Time for more details?

- Noise
- Air quality
- Lighting



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Air quality

- “Ventilation must be maintained at a high enough rate to provide clean air in all areas of the shelter including within primary enclosures.
- All ventilation systems must be adequately maintained and air quality should be monitored at the level of the animal.
- Ventilation requirements vary depending on population density and pollutants in the air.”



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Air quality: which is better to prevent URI?



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Looking at another species

A new look at air quality
and calf respiratory disease

Ken Nordlund, DVM
School of Veterinary Medicine
University of Wisconsin-Madison

Individual pens
Solid or mesh
Variable bedding
Pen covers?



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A short slide on air quality

- Increase fresh air: animal ratio
 - Reduce density
 - Add fresh air
 - Facilitate air flow within cages and rooms
- Reduce contaminants
 - Minimal aerosol spray of correctly diluted disinfectant
- Reduce temperature and humidity
 - But provide for thermoregulation
- Clean the air

$$C = \left(\frac{N}{V} \right) \times \left(\frac{R}{q_r + q_s + q_d + q_v} \right)$$

$$\left(\frac{N}{V} \right)$$

- Number animals divided by building volume is stocking density
- Stocking density is the most important determinant of air hygiene
- A 10-fold increase in ventilation rate needed to compensate for a 2-fold increase in stocking density



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Lightening up

- “Facilities should be designed to offer as much natural light as possible.
- Enclosures should be positioned so individual animals can avoid being exposed to excessive amounts of light or darkness.
- Light and darkness should be provided so that they support the natural (circadian) rhythms of wakefulness and sleep. Adequate lighting is also necessary for effective observation of animals”



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Lightening up

- Consider position, size and color
 - Light background for better viewing and health monitoring
- Put lights on timer to approximate natural light cycle
- If you must use dark, hard to see cages, rotate animals



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Noise matters

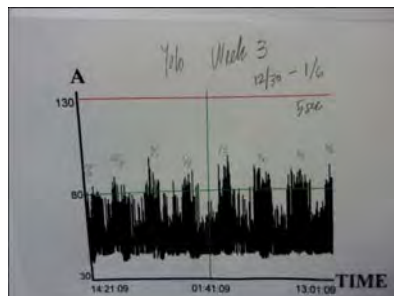
- “Noise should be minimized in animal areas.
- Any sound in the 90–120 db range can be felt as well as heard and may lead to irreversible hearing loss in humans.
 - For comparison, a jackhammer produces noise in the 110 db range, and a subway train 95 db.
 - Levels of 50–70 db or higher are considered likely to be detrimental to the hearing of rodents and rabbits.”



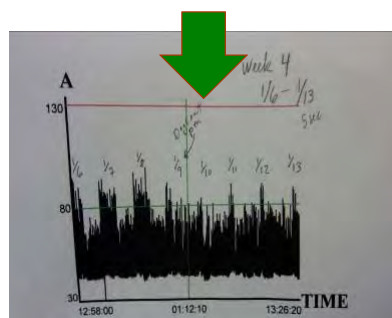
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Even a few dogs can be very loud

Cat housing with 2 Chihuahuas



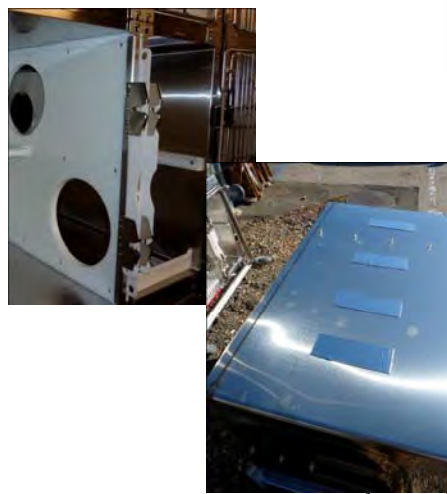
Cat housing with no Chihuahuas



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Noise management

- Consider cage and latch material and design
- Care when cleaning and feeding
- Housing, enrichment and training, especially for dogs



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www.ASPCApro.org/asv

- Register for additional webinars in the series
 - Links to webinar recordings
- Download presentation Slides and bonus materials

Next Webinar in Series:

Keeping Pets Behaviorally Healthy in the Shelter

Thursday, July 28



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Behavior Problems And Long-Term Housing of Shelter Dogs

2000 By Jean Donaldson

- **Introduction**
- **Separation Anxiety**
- **Barrier-related Barking and Aggression**
- **Housetraining Regression**
- **Social Hyper-arousal**

Introduction

As animal shelters achieve success at battling overpopulation, a new problem has come to light: dealing with dog behavior problems arising from long term shelter stays. Previously, dogs coming into shelters with behavior problems or dogs who developed behavior problems in shelters would have quickly been euthanized as competition for available kennel space went to the most highly adoptable dogs, of which there was no shortage. With population numbers coming under control and shelter stays lengthening, kennel space is now available for "behavior" dogs at many shelters.

Unfortunately, dogs with behavior problems tend to languish longer in shelters due to the understandable reluctance on the part of most adopters to take on a dog with possible ongoing behavior challenges. In addition, shelter staff often hold onto the dogs before making them available for adoption in order to work on the behavior problem. The resulting longer stay puts these dogs at increased risk of developing kennel-induced behavior problems as well as having an exacerbating effect on their existing problems.

The behavior problems seen in shelter dogs can be divided into four types.

1) Behavior problems correlated with relinquishment to animal shelters*:

- House-soiling
- Destructiveness
- Noisiness
- Fearfulness

- Escaping

(*the same UC Davis study that made these findings, to be published this year, found dogs that had never had formal obedience training or were perceived by their owners to be unaffectionate or unattractive were also at elevated risk)

2) "adoption Buster" behavior problems. These are problems associated with dogs being passed over by potential adopters, once in a shelter:

- Aggression towards people
- Aggression towards dogs
- Shyness
- Kennel or barrier displaying
- Jumpiness and mouthiness in initial meeting

3) Separation anxiety (not necessarily caused by shelter relinquishment - any time a dog changes owners, the risk of him developing separation anxiety goes up)

and

4) Problems caused by the kennel environment. These are:

- Barrier-related barking
- Barrier-related aggression
- Shyness
- Housetraining regression
- Social hyper-arousal

It is extremely important to note that the problems in categories three and four, those associated with the experience of being re-homed or being kenneled, are all found in categories one and two (or both). The inevitable conclusion is that the rehoming experience, especially through an animal shelter, can cause or exacerbate existing behavior problems, and the shelter experience itself then negatively impacts the dogs adoptability and increases the likelihood of future relinquishment.

Clearly, to be successful at placing longer term dogs, shelters must address the issues of separation anxiety, kennel presentation (barrier issues and social hyper-arousal) and housetraining to improve their track records at placing behavior-case dogs. What follows are overviews of shelter-stay related problems and possible strategies to mitigate kenneling effects and/or solve behavior problems in our shelter dogs.

Separation Anxiety

The prevailing theory of separation anxiety - with its characteristic distress vocalizing, panic elimination and property destruction - stresses that dogs who do not learn to cope with separation from their owners or have developed an

overly intense attachment due to continuous access are at increased risk of its development. Furthermore, if dogs are abandoned or lose their owners, they may develop overly intense and insecure attachments to subsequent owners (Borchelt & Voith, 1982 & 1985, McCrave 1991). This is the rehoming dilemma.

Separation anxiety is frequently kicked off by a long period of constant togetherness followed by an abrupt, enforced separation. A typical scenario is a dog acquired by someone during a work hiatus. The dog is with the owner twenty four hours a day, seven days a week and, when the hiatus ends, is suddenly confronted with daily 8 - 10 hour absences. Separation anxiety ensues. Another common presentation would be the development of separation anxiety following boarding or rehoming. It has also been suggested that artificial selection for more affectionate, neotenized animals has increased the genetic tendency towards separation anxiety in domestic dogs (Fox, 1978, Serpell, 1983, Mugford, 1985).

Shelters can both minimize the incidence of separation anxiety and resolve many cases by implementing the following:

- 1. Environmental enrichment** to alleviate general distress during the dog's shelter stay. These efforts can include: walks, clicker and/or obedience training, group or pairs housing and/or regular dog-dog free play, food delivery enrichment strategies and training efforts directed at the dog's particular behavior problem(s). Most of these are time-intensive and require adequate training in execution for staff or volunteers administering them.
- 2. Effective intervention** when separation anxiety develops. This requires good knowledge of systematic desensitization and pharmacological intervention on the part of shelter staff and veterinarians and management/support options for owners during the course of treatment.
- 3. adoption counseling.** Thoroughly briefing adopters on do's and don't's about the early weeks and months with their newly adopted dog, as well as supplying ongoing support to adopters in order to diagnose and address separation anxiety early on. For instance, it is imperative to avoid smothering new dogs with attention their first few days home. It is understandable that owners are fascinated by their new pets and want to make the new addition feel welcome and happy, however constant togetherness sets the dog up for a fall when normal life is finally resumed. It is far better to avoid high contrasts in home and away time, the rule of thumb being many absences, beginning with extremely brief (>1 minute) ones and gradually progressing to longer over the first few days.
- 4. Dog behavior education.** Aggressive community outreach to dog owners and the general public who may one day be dog owners, with good, catchy information on management, behavior and training (including home-alone training) - to prevent relinquishment for behavior reasons from ever happening in the first place.

Barrier-related Barking and Aggression

Dogs get important information about other beings with their noses and through up-close interaction and investigation. Most dogs therefore feel compelled to make social contact when they see a person or dog. In a kennel, tie-out or in many on-leash situations, they may be repeatedly unable to do so. The result is barrier-frustration. Barrier frustration behaviors - barking, lunging and aggressively displaying at dogs or people from behind bars, fence or glass - exemplify the general concept of "thwarting": the physical prevention of an animal behaving as it is highly motivated to behave.

Physiological stress responses, emotional states and certain well-known behaviors (agitation, barking, aggression) can all be reliably predicted by thwarting scenarios, especially chronic ones. The epidemic of thwarting situations in the daily lives of dogs is not yet widely recognized, nor the impact it

has on their behavior. Most notably, environmental exploration and establishment of social contact with people and other dogs are prohibited by leashes, fences and enforced obedience.

It would be difficult to design a more frustrating environment for a dog than a kennel. In most kennels, dogs are kept alone in extremely barren environments virtually around the clock, with some tantalizing visual access to the outside world. This low-stimulation situation is then punctuated by people and other dogs going by - they're always visible but they can't be investigated. The dog's urge to meet and investigate is repeatedly frustrated. With repetition, the sight of dogs and/or people becomes associated, through classical conditioning, to the feelings of frustration and agitation. When the dog finally has the opportunity to meet, his behavior is over the top in intensity and may be aggressive.

The dog's poor social behavior may then cause the staff to prohibit the dog from further social contact. In addition, defensive responses from the other dogs he encounters or punishment by walkers for unruly or seemingly aggressive behavior may make the dog's behavior even worse. The sight of dogs and/or people may then be associated with a high likelihood of punishment and aggressive responses from other dogs, along with the original frustration. This results in further deterioration of behavior and a cycle develops.

Barrier frustration usually manifests in a shelter environment as dramatic barking and lunging displays at passers-by to the dog's kennel. This can bleed over to on-leash lunging and aggression and, with sufficient time for classical conditioning to take place, aggression directed at people or dogs, including out of the original context of the kennel or other thwarting situation.

This is a severe problem. Fortunately, however, it's well-understood and relatively simple to remedy by:

- 1. Preventing visual access to corridor** to dogs prone to in-kennel display or, possibly, to all dogs in kennel (this needs research), or
- 2. Counterconditioning a competing emotional response** as people walk past the dog's kennel. The easiest practice is to use part of the dog's daily meal ration. The dog's food is stored conveniently near his kennel - any person grabs a few pieces before passing by and delivers them to the dog on his/her way by. The food elicits eating behavior, which prevents lunging, barking and aggression. This simple technique can also be used to ameliorate an existing barrier-frustration problem in many cases.

This latter solution is more labor-intensive and requires kennel design to incorporate regular food delivery in this manner. However it has nice fringe benefits (socialization, conditioned emotional response to people/dogs and the possibility of using food to reward desired behavior such as sitting) whereas the management by blocking visual access approach requires some rudimentary kennel remodeling.

Housetraining Regression

Dogs adopted out from animal shelters will often lapse in their housetraining following their stay in the shelter. The likely reasons are:

- 1. Kenneling forces elimination in the dog's living quarters.** The habit of deferring elimination is therefore temporarily monkey-wrenched (note: previously housetrained dogs re-learn to defer elimination quickly if properly managed the first few weeks in their new homes).
- 2. Newly adopted dogs are sometimes given too much freedom** initially by well-meaning owners, sometimes to the point of allowing inappropriate elimination habits to become ingrained in the new setting.
- 3. Dogs are poor generalizers to start with.** When dogs learn where to eliminate they are not learning an indoor vs. outdoor concept but something much more specific, such as "never eliminate in these rooms" (the rooms in the particular house the dog lives in). Therefore, rehoming in and of itself can cause innocent housetraining accidents - the dog is unsure whether the same rules apply in the new home. Humans, being master generalizers, do not easily empathize with dogs and fail to take cautionary measures.

A few different measures might address this concern:

- 1. In-shelter crate training.** David Tuber (who audio-taped hundreds of dogs home alone) found that if shelter dogs were gradually acclimated, over several days at the shelter, to staying in a large, airline crate and then sent home with that crate and instructions on its proper use, the likelihood of the person keeping the dog was greatly increased. It is likely that both housetraining and chew-training mishaps were thus minimized.

Crates can become associated with comfort and safety during a dog's stay in a noisy, drafty kennel. The crate contrasts positively with the ambient environment. The opposite often occurs when owners try to crate-train dogs in their homes. The crate negatively contrasts with the pleasant house the dog is living in. It is therefore wise to establish crates while dogs are in animal shelters, both to relieve stress and to achieve an early positive association with the crate through the positive contrast effect.

- 2. Prioritizing housetraining at animal shelters.** This is, again, a staff and/or volunteer intensive undertaking. Dogs would need to be walked at least three to four times per day and possibly crated if they were not holding their bladders in their kennels. Kennel runs could also be made more home-like with the use of tile or linoleum substrate and inclusion of rudimentary furniture items. An alternative would be foster-care for dogs suspected of not being housetrained. Certain foster homes might specialize in adult house-training.
- 3. Post-adoption support.** This could be in the form of scheduled counseling appointments or, in lower risk cases, phone follow-up. Not only should adopters leave with solid information on what to expect and how to train their new dog, they must know there is a safety net should they feel overwhelmed.

Social Hyper-arousal

Everyone pays lip service to the refrain that dogs are social animals and yet most animal shelters in the US are still housing dogs singly, for days, weeks and sometimes months at a time. The result, at worst, is compulsive behaviors in the form of pacing, circling, bouncing off walls and self-directed behavior and, at best, over-excitement on those occasions when the dog gets social contact. This is off-putting to potential adopters who are likely to label a dog "hyperactive" or unmanageable rather than see the dog's behavior as driven partly by the abnormal context. The solution is, again, multi-fold:

- 1. Group housing, pairs housing and regular dog play groups.** It is hard to overestimate the value of free dog interaction, both from the standpoint of development of social skills (with resulting lowered risk of dog-dog fear or aggression problems) and environmental complexity. Logistical problems are not insurmountable and the likely higher frequency of agonistic behavior (i.e. fights) is far outweighed by the benefits to most individual animals.
- 2. Time spent with shelter dogs that is just an in-kennel visit** (i.e. simple, low-key hanging out with dog) rather than "action" oriented. If all visits to dogs' kennels predict walks, exiting the kennel or feeding time, humans become classically conditioned predictors of excitement. This can obviously worsen existing hyper-arousal when potential adopters meet kenneled dogs. Kennel runs could be provided with seating to make them more human-friendly. Books or magazines could be on-hand to promote inactive human presence.
- 3. Regular training.** This teaches the dog specifically how to behave in a visit-to-kennel situation as well as providing much-needed problem solving (training, if reward-oriented is extremely enjoyable to most dogs). Even when dogs master basic obedience, there is no limit to what they can be taught with techniques like clicker training, which further enhances their adoptability and degree of mental stimulation. Clicker training is easy to learn, forgiving of trainer error (and so can be implemented by moderately skilled volunteers) and has the added fringe benefit of giving the dog a sense of partial control over his stress-filled environment.

Summary

Both environmental stimulation and rehabilitation of shelter dogs with serious behavior problems are fields in their infancy. The next few years are likely to yield important insights and technical breakthroughs, which will have significant impact on the quality of life of dogs in shelters and number of dogs saved.

After reading this article, click here to take the quiz and receive a Certificate of Attendance! (<http://www.proprofs.com/quiz-school/story.php?title=NjQzMjIwO8JF>)

Jean Donaldson

Jean Donaldson is a widely known and respected dog behaviorist and trainer. Her two books, *The Culture Clash* and *Dogs Are From Neptune* have exploded many of the myths we hold about our "best friends". Her aim is to provide accurate and "user friendly" information to enable dog lovers to build harmonious relationships with their canine companions. Jean is currently on staff at The San Francisco SPCA where she is formulating a new dog training model for both sheltered and owned animals. Previously, she ran her own dog training school in Montreal, Canada.

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