

# A Lifesaving Model: Teaching Advanced Procedures on Shelter Animals in a Tertiary Care Facility

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## ABSTRACT

It is estimated that there are over 5 million homeless animals in the United States. While the veterinary profession continues to evolve in advanced specialty disciplines, animal shelters in every community lack resources for basic care. Concurrently, veterinary students, interns, and residents have less opportunity for practical primary and secondary veterinary care experiences in tertiary-care institutions that focus on specialty training. The two main goals of this project were (1) to provide practical medical and animal-welfare experiences to veterinary students, interns, and residents, under faculty supervision, and (2) to care for animals with medical problems beyond a typical shelter's technical capabilities and budget. Over a two-year period, 22 animals from one humane society were treated at Colorado State University Veterinary Medical Center. Initial funding for medical expenses was provided by PetSmart Charities. All 22 animals were successfully treated and subsequently adopted. The results suggest that collaboration between a tertiary-care facility and a humane shelter can be used successfully to teach advanced procedures and to save homeless animals. The project demonstrated that linking a veterinary teaching hospital's resources to a humane shelter's needs did not financially affect either institution. It is hoped that such a program might be used as a model and be perpetuated in other communities.

**Key words:** shelter, humane, teaching, training, welfare

## INTRODUCTION

The veterinary profession has become increasingly specialized over the last decade.<sup>1</sup> Specialization permits most referral institutions to handle a complex and varied case load, but the advanced nature of these cases makes them inappropriate for training novices. Thus, over time, veterinary students, interns, and residents at some institutions are receiving less and less hands-on clinical experience in primary veterinary medical care. This is a problem for veterinary students, who will graduate having performed few basic medical and surgical procedures.<sup>2</sup> Many recent veterinary graduates feel unprepared for managing conditions frequently encountered in practice.<sup>2</sup> Educational institutions also experience budget restrictions that further diminish available teaching resources. The veterinary profession needs to continue to devise new and innovative ways to train graduates for this increasingly demanding profession. Many models and computer-aided tools have been created for use in training veterinarians; although studies of these models demonstrate good proficiency outcomes, case-related experience with live animals is still considered invaluable by many faculty.<sup>3</sup>

One emerging and rapidly growing veterinary specialty is the field of shelter medicine.<sup>4</sup> Each year, more than 5 million homeless animals enter shelters in the United States.<sup>5</sup> Animal welfare and pet overpopulation are problems faced by communities across the country, and veterinarians are integral to the successful management of these issues.<sup>4</sup> Until recently, the role of the veterinarian in an animal shelter was limited. Over the last 20 years, however, animal shelters have undergone tremendous changes.<sup>6</sup> Shelters were once thought of as holding and euthanasia facilities;

now they are places of hope and rehabilitation for animals in need. Veterinarians in shelters must be capable of practicing a different type of veterinary medicine than that involved in private practice, and shelter medicine is being recognized as a specialty discipline because of the epidemiological and other skills it involves.<sup>4</sup> Shelter practice is not simply the practice of small-animal veterinary medicine in the context of a humane society. Rather, shelter medicine is an organized effort to provide medical care to all animals within a population. Shelters are not hospitals; treatment is time consuming and costly, and it often results in prolonged animal stays, which can be detrimental both to the animals and the goals of the program. Shelter veterinary protocols strive to improve the health and well-being of homeless animals through nontraditional but science-based and practical programs. Many veterinary schools are integrating shelter medicine into their primary curricula, and several have developed externship, internship, post-graduate, and residency programs.<sup>7</sup> The Association of Shelter Veterinarians, formed in 2001, has grown into a global network of over 750 members, is actively working to advance the field of shelter medicine, and has taken initial steps to establish a shelter medicine board specialty.<sup>8</sup> Scientific research is emerging from shelters throughout the world as shelters are found to be data-rich environments. It is anticipated that the need for skilled shelter veterinarians who can guide communities effectively, scientifically, and humanely can only increase.

Colorado State University Veterinary Medical Center (CSU-VMC) is located in close proximity to several regional humane societies. In addition to a shelter internship and residency program, CSU-VMC provides elective rotations

at area shelters, and adoptable animals are used to teach basic anesthesia and spay and neuter procedures. These programs give veterinary students essential opportunities for clinical teaching that are geared toward everyday, practical, economical veterinary medicine.

A need for more advanced diagnostic and therapeutic care was identified at one regional humane society in close proximity to the CSU-VMC. Like most, this shelter frequently admits animals with medical issues that are beyond the resources of their veterinary clinic and must often euthanize animals with potentially treatable problems. The shelter collaborated with CSU-VMC in several ways, including contractual emergency care of stray animals from the county and city. Through this annually renewed agreement, the VMC is preauthorized to provide up to \$120 worth of care for the first 12 to 24 hours of first aid treatment and stabilization, after which point charges must be approved by the shelter. The humane society is charged reduced fees as a component of this contract. Many of the animals admitted on the emergency service have traumatic injuries that require care following initial stabilization. The shelter's budget could not cover medical care for problems such as long-bone fractures or severe wounds, nor could CSU-VMC subsidize the bill. The objective of this study was to develop a protocol to allow students, interns, and residents to perform advanced primary-care surgical procedures on shelter animals, thereby improving animal lives while contributing to their veterinary education without affecting the budgets of either institution. Key to the project was a \$10,000 grant solicited from PetSmart Charities, which provided \$200 per case.

## **METHODS**

### **Animals**

All animals eligible for the study were required to be owned by the shelter. Because the state of Colorado has a five-day legal holding period for stray animals, stray animals were not considered eligible for the study until this holding period had elapsed.<sup>9</sup> Animals surrendered to the shelter by their owners could enter the study immediately. Animals were not eligible for the study if the original owner or an adoptive owner was found at any time during the study period. Animals were not eligible for adoption until it was determined that their surgical procedure and/or fracture repair had been successful. Study cases requiring post-operative rehabilitation were placed in foster homes approved by the humane society or in the homes of volunteering residents, students, or interns. Animals entered into the study for care were adopted via standard shelter services, with full health disclosure, once they had recovered.

### **Experimental Design**

Prior to being transferred to the CSU-VMC by shelter employees, animals with stable problems were examined by the shelter veterinarian and were behaviorally assessed using the shelter's standardized assessment while in the facility, to determine whether adoption was likely following successful treatment. Animals with emergent concerns were immediately presented to the critical-care service of the CSU-VMC by shelter employees, and occasionally by good Samaritans, in accordance with the county contract. In these

cases, diagnoses and initial treatment plans were made by CSU-VMC clinicians. Shelter behavioral assessments were not always possible because of injuries or the stressful nature of the animal's presentation. A set of standard operating procedures was developed and maintained to facilitate case selection and communication between the VMC and the shelter (see Table 1). Animals with surgical problems suitable for inclusion in the study were evaluated by at least two members of an *ad hoc* committee. Consideration was given to educational benefit, potential for rapid return to function, age and overall health, risk/benefit in relation to the investment required by the shelter relative to the shelter's current resources, potential adoptability of the animal, and current VMC schedule relative to the animal's condition. These factors were then discussed by the committee and the shelter veterinarian. The committee consisted of a shelter resident and a clinician with expertise in the veterinary specialty area most appropriate for the case. Applicable routine emergency care charges were paid by the shelter, by prior agreement. Surgical problems included, but were not limited to, simple long-bone fractures, fractures that could be addressed through limb amputation, simple ophthalmologic procedures, and patent ductus arteriosus (PDA). Understandably, correction of PDA is not considered a basic surgical procedure suitable for student training; however, these cases were included for the benefit of surgical residents' training.

### **Impact on CSU-VMC Services and Income**

Each case was used to train professional veterinary medical students, interns, and residents in multiple aspects of veterinary medical care. Only cases that could be managed effectively by residents with student and intern assistance were accepted into the study. The students, interns, and residents volunteered their time and performed the procedures at times when they were not involved with the care of other CSU-VMC patients. Faculty members volunteered their time as consultants on each case, to ensure that standard-of-care techniques were used, but did not serve as primary clinicians or care providers. Thus, the management of the cases described here is not believed to have affected CSU-VMC services to other clients. Study cases were not given priority over hospital client cases. If the hospital schedule was too busy for surgery, appropriate pain management was provided and procedures were postponed. Stray shelter animals presenting to the emergency service with non-life-threatening injuries, including certain fractures, are typically managed non-surgically during the five-day stray period. If injuries are determined to require emergent surgery and postponing care might constitute a welfare concern, shelter animals are often euthanized. The same policy was followed for this study. During the waiting period for surgery, appropriate charges were maintained and covered by the shelter or by the grant. Technicians assisting with anesthesia and surgery also volunteered their time and were used only when not involved with other CSU-VMC clients. Diversion of cases to the study did not affect VMC income, as these animals would otherwise have been euthanized or treated elsewhere.

### **Funding**

The funding for this project came from shelter funds and from the PetSmart Charities grant. The animals entering

**Table 1: Standard operating procedures**

1. The animal will be admitted to the CSU-VMC by a shelter employee or a good Samaritan and usual charges will be applied to the humane society.
2. CSU-VMC doctors will stabilize the patient and determine the extent of the injuries and medical issues.
3. The admitting CSU-VMC doctor will interact with the appropriate shelter staff and determine that the animal is not owned and legal holding periods have been considered for stray animals. The extent of medical issues and care will be communicated.
4. Shelter staff will determine whether or not they believe the animal to be adoptable if repaired or whether euthanasia is more appropriate.
5. If the animal is deemed adoptable with repair, the shelter resident will be contacted by shelter staff to indicate that the animal is suitable for study inclusion according to shelter criteria.
6. The shelter resident and a committee member will evaluate the case and determine that it meets criteria for entry into the project. Consideration to educational benefit, potential for rapid return to function, age and overall health, the risk:benefit in relation to the investment required by the shelter relative to the shelter's current resources, potential adoptability of the animal, and current VMC schedule relative to the animal's condition will be given.
7. If criteria are not met, shelter will be contacted to determine disposition of the animal.
8. If criteria are met, a suitable surgical resident or intern who volunteers to manage the case, perform the surgery, and provide follow-up will be identified.
9. A suitable senior student from soft tissue surgery or orthopedic services who volunteers to manage the case, assist with the surgery, and aid in the follow-up will be identified.
10. The projected cost of the surgical repair (excluding the \$200 contribution from the grant) will be communicated by the shelter resident to the shelter for approval. This verbal approval will be recorded in a VMC medical record maintained as for any other case.
11. All charges will be maintained as for any other clinical case with the exception of anesthesia and surgery, which will be charged at research equipment usage costs.
12. The volunteering surgery resident/intern and student will work with the critical care unit (CCU) to manage the case if it remains in CCU.
13. If there is some delay until surgery can be performed and the animal is stable, it will be returned to the shelter or managed in the wards at CSU-VMC by the resident/intern and student. This decision will be made on consultation between the shelter resident, the surgery resident/intern and student, and the shelter.
14. The volunteering surgery resident/intern and student will work with the appropriate clinical service to schedule and perform the procedure at a time that does not impact hospital business and when the committee faculty advisor is available for consultation.
15. When deemed appropriate by the shelter resident and the supervising CSU-VMC clinician, the animal may be released post-operatively to the care of the shelter until a suitable owner is found.
16. Study cases entering foster homes will only be in humane-society-approved foster homes or homes of veterinary students, residents, or interns who will have educational benefit from case management.
17. Suture removal and incision management will be performed in most cases at the shelter.
18. Radiographic follow-up will be provided by the CSU-VMC and charges applied to the shelter or grant (if the \$200 was not spent completely during work-up and surgery).
19. New owners will not be identified until it is known that surgery and/or fracture repair is successful. Animals will be adopted with full health disclosure.

the study were being used for teaching; they were tended by students, interns, and residents voluntarily, during free time, and would not otherwise have been managed at the CSU-VMC; therefore, the regular anesthesia and surgery fees were not applied. Instead of charging routine CSU-VMC client-owned animal fees, the anesthesia and surgery equipment required for each case was rented, with permission from the CSU-VMC director, at the standard rates charged for teaching or research. This procedure resulted in large cost savings per case. Surgical supplies, including orthopedic implants, drugs, hospitalization, bio-

security fees, surgical room cleaning, and other ancillary service fees (e.g., radiographs, clinical pathology) were charged at regular prices. If additional charges were accrued above the \$200 per animal from the PetSmart Charities grant, they were paid by the shelter or by participating interns and residents, who could elect to spend funds from an annual teaching pool designated for their individual use. During expenditure of the initial grant funds, the shelter actively solicited donations for a new fund to allow perpetuation of this program, and some funds were donated by the Center for Companion Animal Studies at CSU.

Table 2: Advanced teaching cases entered into the Colorado State University / PetsSmart Charities collaboration

Case	Signalment	Problem	Treatment	Grant Expenses (\$)	Total Cost (\$)	Shelter Expense (\$)	Estimated True Cost (\$)
1	Domestic short hair	Left maxilla fracture	Femoral head ostectomy (FHO)	200.00	665.00	365.00	3,000
2	Labrador retriever mix	Left comminuted femoral fracture	External fixator repair	200.00	513.00	313.00	4,000
3	Domestic short hair	Left open metatarsal fracture	Limb amputation & castration	200.00	199.91	0	1,500
4	Domestic short hair	Right brachial plexus avulsion	Limb amputation & ovari hysterectomy	96.43	96.43	0	1,500
5	Labrador retriever mix	Bilateral entropion	Surgical suture repair	168.10	168.10	0	800
6	Domestic short hair	Left coxofemoral luxation	FHO	113.11	113.11	0	1,000
7	Chihuahua	Unilateral nictitans gland prolapse	Surgical imbrication & castration	200.00	200.00	0	800
8	Domestic long hair	Left brachial plexus avulsion	Limb amputation & ovari hysterectomy	200.00	200.00	0	1,000
9	German shepherd	Canine patent ductus arteriosus (PDA)	PDA ligation & ovari hysterectomy	200.00	481.17	281.17	4,000
10	Domestic short hair	Feline PDA	PDA ligation	200.00	427.96	227.96	4,000
11	Mastiff	Left closed transverse tibia-fibula fracture	External fixator repair	300.00	1844.95**	544.95	3,000
12	Jack Russell terrier	Oblique transverse distal femur fracture	Internal fixation & castration	300.00	842.55	542.55	3,000
13	Domestic short hair	Left congenital anomaly, hind limb	Limb amputation & castration	276.28	276.28	0	1,000
14	German shepherd	Cranial cruciate ligament rupture	Extracapsular stabilization	300.00	315.88	15.88	1,500
15	Domestic short hair	Severely comminuted fractures of right femur	Limb amputation	300.00	556.87	256.87	1,000
16	Miniature poodle	Right femoral head fracture	FHO & ovari hysterectomy	300.00	320.25	20.25	1,000
17	Beagle	Bilateral prolapsed nictitans glands	Surgical imbrication	214.65	214.65	0	800
18	Domestic long hair	Midshaft femur fracture	Internal fixation & castration	300.00	282.31	0	1,000
19	Husky	Bilateral entropion	Surgical repair & castration	150.00	150.00	0	800
20	Australian heeler	Supraglenoid tubercle avulsion fracture	Screw and wire surgical fixation	300.00	555.63	255.63	1,000
21	Domestic short hair	Left femoral fracture	Limb amputation & castration	276.28	276.28	0	1,000
22	Dachshund	Right prolapsed nictitans membrane	Surgical imbrication & castration	77.40	77.40	0	1,000
Totals:				4,872.25	8,777.73	2,823.30	35,000.00

\*The estimated true cost includes faculty, resident, and intern volunteers' time as well as client cost.

\*\*Teaching credits applied for external fixator and \$50.00

## RESULTS AND DISCUSSION

Over a two-year period, 22 animals entered the study. These were animals that would have otherwise been euthanized because of the severity of their problems. The animals had a variety of problems, as outlined in Table 2. All 22 were successfully treated and subsequently adopted. Total grant expenditures were \$4,872.25; the total cost to the shelter for further surgical and perioperative care, excluding contractual charges and the charges covered by the grant, was \$2,823.30. It is estimated that if these 22 animals had been treated as regular VMC patients, the cost to the shelter would have exceeded \$35,000.

Each case directly involved, at minimum, a resident, an intern, and at least one student. Thus it can be extrapolated that the program provided a minimum of 66 educational opportunities. Because the cases were of a nature not frequently managed directly by house officers or students in a veterinary school, it is expected that the long-term effects of this program will benefit animals with similar problems seen by these individuals in the future. The cases were popular with the students and veterinarians, and finding volunteers to manage them was never an issue; it appeared that most were willing to take personal time for these cases. Exposing hospital staff and students to successful community-service programs may be an important way of encouraging future volunteer service.

While each case provided a wealth of learning opportunities, several difficulties were encountered that were also very educational. The initial plan was to expend the grant over a one-year period; even after two years, grant funds still remain. The project took some time to develop into an operational system. Staff turnover and internal change in the shelter's veterinary department, as well as the annual changes in the VMC's house officers, contributed to a slow awareness of this project's existence. For a project like this to be successful, participating shelters must be well managed and committed to medical rehabilitation.

One of the administration's greatest concerns about this project was its potential to divert clinician and staff time from other responsibilities, and thus from hospital business. Although the system of scheduling grant cases during times when staff and clinicians could function as volunteer consultants appears to have been followed, this proved difficult to track accurately. Most surgeries were performed during normal business hours at times when daily activities were slow. The possibility does exist that such a plan will be abused. For technicians, who are paid on an hourly basis, punching out on a time clock could avoid this concern. Clinicians and administrators participating in a program like this must communicate and strategize about the balanced use of off-clinic time and must regularly evaluate the program's benefits and risks.

Unfortunately, there is no shortage of animals in need, or people who own animals in need, in any community. Both a clear definition of cases that qualify for entry and appropriate communication from all participating parties are necessary for a project like this to work. An animal considered highly adoptable by a surgical resident in the university setting, unfamiliar with animal sheltering, may truly not be. Shelter-trained individuals with a background in legal, behavioral, and overall adoptability issues should

be involved in the initial assessment, in order to limit the number of animals deemed unadoptable following recovery, but this possibility should nevertheless be recognized and planned for in advance. During the study period, because of the expense of veterinary care, it was not uncommon to find student-owned animals, or animals with owners "in the wings," whose owners tried to enter them into the grant program as "homeless," only to subsequently "adopt" them. At the CSU-VMC, mechanisms for subsidized and low-cost veterinary care exist separately from the PetSmart grant and the humane society's emergency-care fund, which has generated substantial donations. It is recommended that these distinctions be made clear. Communities value and need programs that provide veterinary care for individuals and animals that might otherwise not have access. We believe it is essential to have clear written policies, and an objective committee with a shelter-trained representative willing to adhere to those policies, to provide proper oversight of a grant of this type.

## CONCLUSION

As veterinary educators seek ways to better serve their students, the use of shelter animals for teaching advanced primary-care surgical procedures warrants exploration. The benefits of a program like the one described here have a deeper scope than simply teaching a procedure or saving a life. The opportunity to participate in a community program is valued and appreciated by students, and may encourage many to incorporate service work into their professional lives. Fostering humane attitudes in the university environment is an important component of teaching and should be a consideration in the veterinary curriculum. This project, which began as a simple demonstration of how collaboration between a humane society and a veterinary teaching hospital might work, has demonstrated great success in just two years. Funding to continue to develop the program is already being generated from donations and grant acquisitions. It is anticipated that the program will expand to include regional shelters and may easily become a model for other communities.

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