DACUM Research Chart for Shelter Medicine Specialist

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Association of Shelter Veterinarians

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Duties	← ——————————————————————— Tasks* —————

Duties | **← Tasks* →**

A — Optimize Shelter Animal Physical Health

A-1 Design sanitation & dis-infection protocols for animal shelters	A-2 Design biosecurity procedures for animal shelters (e.g., quarantine, segregation, traffic patterns)	A-3 Maintain optimal environmental conditions in animal shelters (e.g., temperature, air, humidity, light)

A-10 Design nutrition programs for shelter animals	A-11 Design protocols for individual patient care in the shelter	A-12 Recommend husbandry standards for animal shelters	A-13 Create medical & surgical protocols for animal shelters

A-18 Design safe field triage/capture/handling/transport protocols for animal shelters			

B — Optimize Shelter Animal Behavioral Health

B-1 Establish behavioral selection criteria for shelter animals (e.g., adoption, treatment, euthanasia)	B-2 Develop behavioral assessment protocols for shelter animals (e.g., intake, testing)	B-3 Advise on adopter/ animal compatibility

B-8 Design stress management programs for shelter animals (e.g., individual & population)	B-9 Promote acceptable quality of life for shelter animals	

C — Protect Community & Public Health

C-1 Design zoonoses control programs in animal shelters for immunocompromised and healthy people	C-2 Consult on zoonoses control programs in communities for immunocompromised and healthy people	C-3 Consult on rabies control

C-8 Consult on disaster relief & preparedness for animals	C-9 Collaborate with external agencies regarding animals & public health	C-10 Advise on animal shelter environmental impact

D — Alleviate Companion Animal Homelessness

D-1 Serve as resource on epidemiology of companion animal homelessness	D-2 Design high-quality spay/neuter programs (e.g., high-volume, mobile, feral cat, targeted, pediatric)	D-3 Advance non-surgical sterilization of companion animals

E — Address Animal Cruelty/Abuse/Neglect (CAN)

E-1 Educate multiple constituents on animal CAN recognition & reporting	E-2 Provide forensic expertise for animal CAN investigation	E-3 Serve as an expert witness for animal CAN cases	E-4 Provide humane animal capture, transport, & housing in animal CAN cases

F — Facilitate Animal Shelter Management

F-1 Advise on resource allocation in animal shelters (e.g. personnel, budget)	F-2 Design animal identification tracking & data analysis systems for animal shelters	F-3 Advise on legal medical record keeping in animal shelters

G — Serve as a Resource on Animals & Public Policy

G-1 Provide expertise on legislative items & policies related to animals	G-2 Serve as a resource on animal regulatory issues & agencies (e.g., CDC, USDA, Fish & Wildlife)	G-3 Provide expertise regarding community animal programs

H — Advance Animal Shelter Medicine

H-1 Promote development of shelter medicine education curricula	H-2 Contribute to research in shelter medicine	H-3 Educate veterinary & shelter community regarding shelter medicine

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A-4 Consult on facility/ housing design & management	A-5 Design vaccination protocols for shelter animals	A-6 Design infectious disease protocols for shelter animals (e.g., parasitic, bacterial, viral)	A-7 Diagnose disease outbreaks in shelter animals	A-8 Manage disease outbreaks in shelter animals	A-9 Design disease surveillance programs in animal shelters
A-14 Advise on population management/density in animal shelters	A-15 Develop medical record-keeping systems for animal shelters	A-16 Advise on medical selection criteria within animal shelters (e.g., adoption, treatment, foster)	A-17 Design euthanasia protocols for animal shelters (e.g., technical training, body disposal)		
B-4 Advise on diagnosis, prognosis, and treatment of common behavioral problems for shelter animals		B-5 Design preventive behavioral programs for shelter animals (e.g., environmental enrichment & socialization)	B-6 Provide recommendations for companion animal training	B-7 Develop protocols for safe animal handling	
C-4 Provide recommendations for dog bite prevention		C-5 Advise on dangerous animal issues (e.g., wildlife, exotics, domestic)	C-6 Participate in emerging, reportable & foreign animal disease surveillance	C-7 Consult on animal cruelty, abuse, and neglect	
D-4 Advise on humane education programs	D-5 Provide for companion animal surrender intervention programs	D-6 Design animal-owner reunification programs	D-7 Design shelter animal transfer programs		
E-5 Manage animal CAN victim rehabilitation					
F-4 Consult on animal shelter regulations (e.g., OSHA, DEA)	F-5 Advise on compassion fatigue in animal shelters				
G-4 Provide information on animal shelter history, trends, & programs	G-5 Provide expertise on animal shelter ethical issues	* The panel members represented at least three major positions within the specialty of Shelter Medicine. These included persons who are employed as shelter administrators, shelter consultants, and shelter educators/researchers. While one "best" verb was selected for each duty and task, different verbs may better reflect what an administrator does (e.g., provide or implement) vs. a consultant (e.g., advise or recommend) vs. an educator/researcher (e.g., teach or advance).			
H-4 Communicate with the public as an expert on shelter medicine issues	H-5 Pursue professional development in shelter medicine				

General Knowledge and Skills

Population medicine/health	Recognition of CAN	Communication skills	
Small animal medicine	Forensics	Conflict negotiation	
Small animal surgery	Shelter facility design	Multi-tasking	
HVHQ surgical proficiency	Standards of care	Management skills	
Animal behavior	Diagnostic testing	Humane restraint and capture	
Infectious disease	Crisis management	Regulatory agencies and policies	
Emergency and critical care	Legislative process	Legal & policy issues in shelter	
Anesthesia/analgesia	Maintenance skills	medicine	
Pain management	Animal husbandry	Shelter definitions, management,	
Preventive medicine	Stress management	& philosophy	
Pharmacology	Problem-solving skills	Shelter support & advocacy	
Vaccination & immunology	Risk management	groups	
Theriogenology	Leadership skills		
Pediatrics	Training skills		
Pathology	Time management		
Epidemiology	Disaster response		
Statistics			
Ethics			

Worker Behaviors

Compassionate
Dedicated
Detail-oriented
Skilled leader
Emotional stability
Maturity
Professionalism
Inquisitive
Team builder
Open-minded
Flexible
Analytical
Ethical
Politically savvy
Persistent
Resilient
Visionary
Self-motivated
Creative

Tools, Equipment, Supplies and Materials

Animal shelter
Reference reading list
Restraint/capture equipment
Behavior/training equipment
Medical/surgical equipment

Acronyms

ASV	Association of Shelter Veterinarians
CAAB	Certified Applied Animal Behaviorist
CAN	Cruelty, Abuse, and Neglect
CDC	Center for Disease Control
DACVIM	Diplomate, American College of Veterinary Internal Medicine
DEA	Drug Enforcement Administration
DVM	Doctor of Veterinary Medicine
HVHQ	High Volume, High Quality
MPVM	Master of Preventative Veterinary Medicine
MSPCA	Massachusetts Society for the Prevention of Cruelty to Animals
OSHA	Occupational Safety & Health Administration
USDA	United States Department of Agriculture
VMD	Veterinary Medical Doctor

Future Trends and Concerns

Increase awareness of CAN
Longer shelter stays
Animal overpopulation
Improved shelter pet health
Increase veterinary involvement and education in shelters
Veterinary involvement in public policy
Increased availability of sterilization
Academic shelter medicine programs
Improved public perception of animal shelters
Higher public expectation of animal shelters
Shift in species admitted to shelters-cat to dog ratio-entering shelters
International expansion of shelter medicine
Increased involvement in animal welfare
Increased involvement in public health
Increased management of feral cat population
Expanded shelter resources and facilities
Increased prosecution of animal abuse
Increased collaboration among animal stakeholders

Shelter Medicine Specialist: Requirements for Professional Knowledge and Skills

Shelter Medicine Specialist:
Requirements for Professional Knowledge and Skills
Based on Job Task Analysis Validation

*A special task force consisting of veterinary faculty involved in Shelter Medicine training was convened for the purpose of creating standards for post-graduate clinical training in Shelter Medicine.

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Introduction

Background and Significance

Between four to six million dogs and cats are estimated to enter United States animal shelters each year. Most of these animals are homeless; lost, unwanted or abandoned, abused, neglected, or the result of unplanned breeding. Despite rising public awareness of companion animal homelessness and widespread desire to decrease shelter euthanasia rates, it has been estimated that five out of ten dogs and seven out of ten cats entering animal shelters are destroyed.

Increasing public focus on animal welfare necessitates a new, more cohesive role for veterinarians in animal shelters. It is now recognized that science-based recommendations are required to protect the health and welfare of homeless animals. There is an unprecedented demand for skilled veterinarians to design and oversee comprehensive programs that maintain wellness and prevent disease spread in shelters. Veterinary guidance has become even more urgent in recent years as trends for longer term housing of animals in shelters increase, creating populations with even greater risks for developing disease and compromised welfare.

Most communities now have at least one local animal shelter. Many localities have several different types of shelters, each requiring a different type of veterinary guidance, from small sanctuaries that provide lifetime care to large facilities that admit thousands of animals annually. Although some shelters employ staff veterinarians and certified veterinary technicians, shelter animal health care is frequently managed by employees with minimal medical training. These staff members are often tasked with the health care of hundreds of animals. Veterinarians working in shelters frequently report feeling inadequately trained to provide optimal care for populations of dogs and cats. Thus, it is imperative that training in shelter medicine is available to veterinarians so that they can aid the animal shelters in their communities.

The practice of veterinary medicine in an animal shelter differs significantly from conventional small animal veterinary practice. Whereas traditional small animal veterinary practice focuses on the individual patient, shelter veterinary practice emphasizes the health of a population while still ensuring individual animal welfare. The needs of the community must also be addressed, as protection of public and community animal health is part of the mandate for many shelters. In these environments, resources are generally limited, yet quality care must be provided. Often, this necessitates ethical thinking and challenging decisions. Veterinarians who work with shelters must not only possess medical and surgical skills and knowledge, they also must be capable and willing educators and managers, able to draw from many disciplines to meet the needs of the shelter and community. In addition to the design and oversight of basic preventive health care protocols, shelter veterinarians play a role in almost every community service that shelters provide, including; spay/neuter and adoption programs; cruelty investigations; public health protection; stray and injured animal capture, care and control; disaster response; and humane euthanasia among others. Beyond a conventional veterinary education, a strong background is necessary in areas such as epidemiology, population management and statistical tracking, immunology, infectious disease, behavior, public health, general management, facility design and veterinary forensics. While surgical ability, infectious disease knowledge and individual patient care are part of the work, other applicable skills are necessary, but perhaps less apparent to those working outside the field of shelter medicine.

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Veterinarians around the world have recognized that shelter medicine is a rapidly advancing field. Shelter medicine resources are in high demand including scientific journal articles, web-based materials and veterinary textbooks. The Veterinary Information Network (VIN) added a Shelter Medicine Consultant in 2007. The Association of Shelter Veterinarians (ASV), established in 2001, has rapidly grown into a professional organization with more than 600 members and 23 student chapters. Over half of the United States' veterinary colleges have incorporated shelter medicine into their curricula. Some veterinary colleges offer clinical and/or didactic coursework in shelter medicine and many offer clinical externship opportunities. It became clear to many members of the ASV and others interested in the field that individuals serving as specialists in shelter medicine were needed. It is anticipated that this need will increase as veterinarians trained as shelter medicine specialists are increasingly sought to guide community animal shelters effectively, scientifically, and humanely. This has resulted in several veterinary colleges developing postgraduate internship and residency training programs, even though a recognized shelter medicine specialty does not yet exist. The authors of this document believe that the development of a formal residency curriculum leading to a recognized shelter medicine specialty designation is indicated to meet the growing need for trained shelter medicine specialists.

Purpose Statement

The purpose of this document is to provide a description of the foundation skills and knowledge that all shelter medicine residents will achieve during successful completion of a recognized program. It is assumed that residents will enter such programs with a strong background in clinical small animal veterinary medicine. The primary focus of this document is on direct knowledge and skills pertaining to dogs and cats, but requires residents to have familiarity with material pertinent to other species cared for in animal shelters. Acquiring this knowledge requires diverse training including a variety of mentored clinical experiences in the field. A complementary document defines minimum training requirements necessary to achieve the level of knowledge and skill described herein.

Note: The requirements for professional knowledge and skills as defined in this document also apply to veterinarians pursuing a non-residency path to certification in Shelter Medicine.

Methods

In 2005, members of the ASV and other interested individuals submitted a letter of intent to form a recognized veterinary specialty organization in shelter medicine to the AVMA's American Board of Veterinary Specialties (ABVS). The ABVS recommended that the ASV conduct an occupational analysis of shelter veterinary medicine to enhance its application for specialty recognition. In January 2007, a group of individuals considered experts in shelter medicine met with facilitators from The Ohio State University Center for Education and Training for Employment Analysis to perform this analysis, which was referred to as "Developing A Curriculum" (DACUM). During this meeting a Shelter Medicine Career Analysis was developed, resulting in a list of eight general duties and 64 tasks that veterinary specialists would be expected (and ultimately trained) to perform.[1]

[1] Funding for the DACUM analysis was provided by Merial Ltd.

The list of duties and tasks from the DACUM were incorporated into an on-line survey and distributed to members of the ASV and other individuals practicing in the shelter medicine field. Respondents to this survey were asked to evaluate each of the 64 tasks on the basis of the level of responsibility that a shelter specialist would likely exhibit for each task, the frequency with which a shelter medicine specialist would perform each task and the overall importance of each task to the work of a shelter medicine specialist. The following instructions and rankings were provided under the respective categories in the survey.

1. In the "Responsibility" column, choose the number that most accurately reflects the level of responsibility that a shelter medicine specialist would likely exhibit for that task. Choose the *top level of expertise* expected, which may encompass lower levels (e.g. an expert may also be expected to teach and perform tasks independently). Use the scale below to rate the level of responsibility of each task:

5 =	**Expert**:	Expected to be a top expert /consultant /researcher in this area. (e.g. a pre-eminent authority on this subject, able to design recommendations broadly applicable to a variety of settings)
4 =	**Teach Others**:	Conversant with current research and application of this information, able to teach other professionals
3 =	**Advise:**	Provide input to organizations, other experts or communities to aid in the performance of this task
2 =	**Supervise:**	Supervise others in the performance of this task
1 =	**Perform:**	Perform this task independently
0 =	**Not Part of Job:**	Shelter medicine specialists are unlikely to perform this task

2. In the "Frequency" column indicate how often a shelter medicine specialist would perform this task. Use the scale below to rate the frequency of each task.

4 =	**Very frequently:**	This is one of the most frequent tasks shelter medicine specialists are expected to perform (e.g. several times a week, for extended periods during each year, or the majority of the specialist's time)
3 =	**Regularly**:	This is a task shelter medicine specialists would be expected to perform on a regular basis (e.g. several times a month, and/or more than ten times per year, or a significant proportion of the specialist's time)
2 =	**Occasionally:**	This is a task shelter medicine specialists would be expected to perform on an intermittent basis (e.g. once a month or less, or between about 3-10 times per year, or significantly less time than is spent on other tasks)
1 =	**Rarely:**	This is a task shelter medicine specialists would be expected to perform on an infrequent basis (e.g. 1-3 times per year or less)
0 =	**Never:**	Shelter medicine specialists should be aware of this area, but would not be expected to perform this task

3. In the "Overall Importance" column, choose the number that most accurately reflects the overall importance of that task in the job as a shelter medicine specialist.   Use the scale below to rate the overall importance of each task:

5 =	**Great** importance:	Performance is critical to success of shelter medicine specialists
4 =	**Very** important:	Performance is very important to success of shelter medicine specialists
3 =	Important:	Performance is important to success of shelter medicine specialists
2 =	**Some** importance:	Performance is of some importance to success of shelter medicine specialists
1 =	**Little** importance:	Performance is of little importance to success of shelter medicine specialists
0 =	**No** importance:	Shelter medicine specialists are unlikely to perform this task

The analysis clearly identified a skill set beyond that of a graduate veterinarian supporting the need for specialty designation. The results of the DACUM were used as the framework from which this paper evolved.

Using the results of the survey, a composite score for each of the 64 tasks identified by the DACUM was developed, taking into account the score for each component (level of responsibility, frequency of performing the task and overall importance of the task to shelter specialists) (see Appendix A). The overall rankings of each task, by their composite scores, as identified by respondents who were identified as shelter specialists are also provided in Appendix A. These composite scores were used to rank the importance of training for each task. Eight broad categories of knowledge from the DACUM proceedings were used (Table 1). A ninth category entitled "Develop effective means of communication" was added by the authors as it was recognized and agreed that skills in communication are essential to shelter medicine specialists as they must be able to effectively relate in unique contexts to shelter personnel, veterinary and other animal welfare colleagues as well as to the public.

The categories were divided among four working groups of task force members to add, clarify or remove tasks and then to indicate the level of knowledge that should be associated with each task according to standardized definitions (Table 2). The working groups agreed that the category entitled "Addressing animal cruelty/abuse/neglect (CAN)" should be re-categorized under section C, "Protect community and public health", leaving eight main categories. Ultimately, after extensive input from one or more of the working groups as well as external consultants when deemed necessary, each section was reviewed by the entire task force and a consensus was reached to finalize the descriptions for each category. The professional knowledge and skills described by this document constitute that which the authors believe all shelter medicine residency programs must provide to specialists in training. Ultimately, we believe this reflects the level of knowledge residents must achieve to become Board Certified in Shelter Medicine when the specialty is recognized by the ABVS.

Table 1. DACUM Categories

A	Optimize shelter animal physical health
B.	Optimize shelter animal behavioral health
C.	Protect community and public health
D.	Alleviate companion animal homelessness
E.	Address animal cruelty/abuse/neglect *
F.	Facilitate animal shelter management
G.	Serve as a resource on animals and public policy
H.	Advance animal shelter medicine
I.	Develop effective means of communication**

*   *Address animal cruelty/abuse/neglect was re-categorized and included as a component of Section C (C-7).*
** *This category was added by the authors.*

Table 2. Definitions of Levels of Knowledge

Have detailed knowledge or skill:	**Very thorough knowledge, can teach or demonstrate the skill at an expert level, can quote literature extensively** • Shelter specialists are leaders in the veterinary profession in this area of knowledge • Shelter specialists can design research in this area or create new knowledge in this area • Shelter specialists can teach others (including specialists) in this area • Shelter medicine specialists are the ones to whom someone would go to most commonly for knowledge in this area
Have knowledge or some skill:	**Very conversant, can quote some of the literature, can teach at a superficial level or can demonstrate, but not at an expert level** • Shelter specialists can teach at the level of veterinarians (who are not experts in shelter medicine), veterinary students and shelter staff in this area of knowledge • Shelter specialists can refer to others who have more specialized knowledge in this area
Have familiarity:	**Know enough about the topic to talk about it with others at a superficial level and/or guide others to more detailed resources**

Professional Knowledge and Skill Requirements by DACUM Category

This section contains a detailed description of the professional knowledge and skills that all shelter medicine residents should achieve during their training programs. Several sections were added after the original DACUM occupational analysis and survey, which reflects the dynamic and evolving nature of this new discipline. The authors anticipate that the expectations detailed in this document will require periodic revision as the specialty continues to evolve. Some redundancy among sections of this document was inevitable. For the sake of brevity and clarity, redundancy was minimized by referring the reader to other sections where appropriate. Each heading is followed by a percentage that indicates how crucial each task was perceived to be in the practice of a shelter medicine specialist (based on survey respondents' perceptions of the level of responsibility, frequency of performance and overall importance). It is considered more critical that residents master tasks ranked at higher percentages.

A: Optimize Shelter Animal Physical Health

Duties that involve creating and maintaining physically healthy shelter animals received the highest percentile rankings in the DACUM. This reflects the key role that proper infectious disease management plays, not only in ensuring healthy animals for adoption, but also in positively impacting the shelter environment and people and animals in the surrounding community. Veterinarians encounter unique daily challenges maintaining physical health of small animal populations in animal shelters that require a solid interdisciplinary skill set. Design of shelter sanitation protocols, diagnostic procedures, outbreak responses, individual patient care protocols vs. population management, and euthanasia decisions require special skills and training. Preventive medicine is the foundation of shelter medicine where every effort is made to limit disease and optimize physical wellness. The factors that must be considered in this approach often go beyond the typical core of traditional small animal veterinary medical education, where there is more of a focus on treatment of disease. Shelter medicine experts solidly trained to optimize shelter animal physical health will be able to lead facilities, programs, and communities in progressive approaches that promote animal wellbeing.

A-1 Design infectious disease protocols (92.8%)
- Detailed knowledge of common and important viral, bacterial, fungal and parasitic pathogens as they relate to companion animals in shelters
- Detailed knowledge of various shelter philosophies, missions and resources as they relate to policy and protocol development for infectious diseases
- Detailed knowledge of antibiotic selection, mechanisms of action, time and dose dependence, rational dosing regimens, prophylactic and metaphylactic treatment and off-label use
- Detailed knowledge of disease control policies and protocols in shelters
- Knowledge of diagnostic testing methods (e.g. PCR, IFA, ELISA, culture, etc.)
- Knowledge of measures of diagnostic test accuracy
- Knowledge of mechanisms of antibiotic resistance and methods for prevention

A-2 Design vaccination protocols (91.5%)
- Detailed knowledge regarding clinical application of vaccines in shelters, including types of vaccine antigens and their use
- Detailed knowledge of onset and duration of vaccine-induced immunity for diseases of importance in shelters
- Detailed knowledge of vaccine handling, storage, preparation, administration
- Detailed knowledge of available professional guidelines for vaccination of cats and dogs in shelters, trap/neuter/release programs, and spay/neuter programs
- Detailed knowledge of impact of vaccination on disease diagnosis and surveillance
- Knowledge of immune response to infection and vaccination
- Knowledge of potential adverse events
- Familiarity with legal considerations, adverse event reporting, vaccine licensing and labels
- Familiarity with methods of vaccine development

A-3 Design biosecurity procedures (91.2%)
- Detailed knowledge of animal segregation, facility design and traffic flow to minimize disease transmission
- Familiarity with resources for biological risk assessment and monitoring

A-4 Design cleaning (sanitation) and disinfection protocols (90.9%)
- Detailed knowledge of principles of cleaning and disinfection as they relate to animal shelters, including utensils, laundry, vehicles and common use areas
- Detailed knowledge of the spectrum of activity and clinical application of common physical and chemical cleaning and disinfection agents
- Detailed knowledge of use of foot baths
- Detailed knowledge of cleaning and disinfection of vehicles and animal equipment
- Knowledge of hand sanitation practices including hand washing, gloves and sanitizers
- Knowledge of tools for shelter cleaning and disinfection, including cost and equipment requirements for common products
- Knowledge of the mechanisms and safety profiles of common cleaning and disinfection agents
- Knowledge of environmental monitoring methods to verify success of cleaning and disinfection
- Knowledge of handling and storage of common agents relating to light, temperature, contact with air, compatibility, stability, water hardness, relative humidity, pH
- Knowledge of specialized terminology such as biocide, germicide, sterilization process, disinfectant, antiseptic, sanitizers, detergents, antimicrobials
- Familiarity with storage and disposal, OSHA and EPA compliance, and maintenance of MSDS

A-5 Diagnose disease outbreaks (88.2%)
- Detailed knowledge of differential diagnoses for common and emerging contagious respiratory, gastrointestinal and dermatologic diseases
- Detailed knowledge of risk factors for disease outbreaks
- Detailed knowledge of appropriate diagnostic testing strategy and clinical assessment in an outbreak
- Detailed knowledge of clinical investigation of outbreaks, including sampling methods, data collection and risk analysis
- Knowledge of available professional guidelines for outbreak investigation
- Familiarity with molecular methods of outbreak investigation

A-6 Manage disease outbreaks (87.2%)
- Detailed knowledge of specific outbreak intervention strategies (e.g. quarantine, treatment, depopulation) including awareness of impact of shelter philosophy and resources
- Knowledge of outbreak communication considerations including shelter staff, adopters, other shelter/veterinary professionals and media

A-7 Advise on population management and density in shelters (86.7%)
- Detailed knowledge of obtaining and interpreting data regarding population management including: calculation of ideal and actual shelter capacity by species and sub-population (e.g. stray, adoptable, juvenile versus adult), monthly daily averages for intake, inventory and adoption, interrelationship between intake, length of stay and adoption.
- Detailed knowledge regarding calculation of shelter capacity, including physical, logistical and staffing requirements
- Detailed knowledge of impact of crowding and length of stay on disease, animal welfare, and shelter costs and program success
- Detailed knowledge of methods to decrease length of stay and facilitate animal flow through shelter

- Knowledge regarding published guidelines for housing density of confined cats and dogs (e.g. laboratories, boarding kennels, shelters, pet stores)
- Knowledge of alternatives to shelter housing (e.g. foster care, trap/neuter/return, other)
- Knowledge of obtaining computer reports from common shelter software systems regarding population management parameters as described in bullet 1.

A-8 Create medical and surgical protocols (85.3%)
- Detailed knowledge of veterinary medical guidelines for spay/neuter programs
- Detailed knowledge of various shelter philosophies, missions and resources as they relate to medical and surgical policy and protocol development.
- Detailed knowledge for considerations and methods for empirical selection of drugs
- Knowledge regarding clinical small animal medicine and surgery in relation to how these fields are applied in a population setting or resource-limited environment.
- Familiarity with regulations regarding implementation of medical and surgical protocols by non-medical staff and knowledge of same for state of most frequent practice.

A-9 Design disease surveillance programs (83.5%)
- Knowledge of the value and uses of disease surveillance systems in preventive medicine (e.g. those used for livestock, public health and wildlife)
- Knowledge of components of a disease surveillance system (e.g., case-definitions, accurate and appropriate data, feedback)
- Knowledge of use of common shelter software systems for disease surveillance

A-10 Recommend general husbandry standards (82.4%)
- Detailed knowledge of veterinary medical guidelines for care of dogs and cats in shelters
- Knowledge of veterinary medical guidelines for care of dogs and cats in other confined populations (e.g. laboratory)
- Familiarity with general care requirements for other species commonly in animal shelters

A-11 Consult on facility/housing design and management (79.7%)
- Detailed knowledge of facility and housing design to optimize health and welfare and minimize stress and infectious disease transfer (e.g. double sided runs, use of outdoor spaces/air, ventilation requirements, cage versus group housing)
- Detailed knowledge regarding calculation of required facility size in relation to expected capacity – methods to calculate required capacity based on expected/maximum daily, monthly, annual intake, adoptions and turnover time.
- Knowledge of shelter design in relation to overall shelter mission
- Knowledge regarding building materials to minimize infectious disease and problem behavior
- Familiarity with resources for shelter design and building, e.g. architectural and contracting firms that specialize in animal shelters, companies that produce mass or custom designed housing
- Familiarity with a wide range of shelters and housing styles

A-12 Advise on medical selection criteria within shelters (75.5%)

Note on DACUM interpretation: This group interpreted this to include selection criteria for intake, transfer, treatment, euthanasia, or other outcomes depending on shelter philosophy and resources. Establishing medical selection criteria relies on a solid foundation of detailed knowledge regarding varying shelter philosophies as they relate to the disposition of animals, shelter population management strategies, and the impact of availability of shelter resources as described elsewhere in this document.

- Knowledge regarding prognosis, treatment and resources required to provide care for common diseases of shelter animals within professional standards
- Knowledge regarding common shelter practices for management of common diseases

A-13 Maintain optimal environmental conditions in shelters (75.5%)

- Detailed knowledge of recommendations for temperature, humidity, ventilation (air exchange), and lighting for shelter dogs and cats
- Knowledge and familiarity with requirements for other species as described in A-10 above
- Knowledge regarding safe pest control in the shelter
- Familiar with HVAC systems and other methods of maintaining air quality (e.g. housing type, density, air cleaners, fresh air access)
- Familiar with noise control (e.g. sound proofing)

A-14 Design euthanasia protocols (71.7%)

- Detailed knowledge of published guidelines, standards and recommendations for acceptable and unacceptable methods of euthanasia for dogs and cats
- Detailed knowledge of euthanasia methods and routes of administration, including special considerations (e.g. for pregnant animals, neonates, feral/fractious animals)
- Detailed knowledge of pre-euthanasia medication, stages of euthanasia, mechanisms of death and methods of verifying death
- Detailed knowledge of animal behavioral considerations including stress reduction
- Knowledge regarding design of facilities for euthanasia
- Knowledge regarding euthanasia training for shelter staff
- Knowledge of human behavioral considerations (e.g. compassion fatigue, strategies for coping)
- Familiarity with regulations regarding euthanasia, including licensing and certification for staff, handling of drugs, and carcass disposal. Knowledge regarding these regulations for state of most frequent practice
- Familiarity with guidelines, methods and resources for euthanasia of other species

A-15 Design protocols for individual patient care (68.9%)

- Knowledge of differential diagnoses (physical and behavioral) for common health problems in shelter animals
- Knowledge of prognosis for common medical conditions found in shelter animals
- Knowledge of diagnosis and treatment of medical problems that commonly develop in the shelter

A-16 Design safe field triage/capture/handling/transport protocols (63.2%) *Note: Refer to section B for additional areas of required knowledge relevant to this section.*
- Knowledge of secure triage area establishment to allow initial inspection of animals
- Knowledge of conditions that require immediate medical or surgical care
- Familiarity with transport laws of healthy and potentially infectious animals

A-17 Design nutrition programs for shelter animals (61.4%)
- Knowledge regarding stage-appropriate diets and adequate caloric intake for cats and dogs
- Knowledge about published body condition scoring systems
- Knowledge about re-feeding syndrome and appropriate re-feeding strategies short and long term
- Knowledge regarding importance and methods for monitoring weight/body condition in shelter animals
- Familiarity with effects of malnutrition and anorexia on animal health (e.g. response to vaccination, recovery from surgery, hepatic lipidosis)
- Familiarity with indications for special diets/prescription diets for pets with special needs

A-18 Shelter data analysis and interpretation
Note: This category was not in original DACUM so did not receive a numerical ranking. Disease is interpreted broadly to include behavioral disorders and failure of adoption as well as physical disorders.
- Detailed knowledge pertaining to collection and interpretation of data related to shelter animal health and program success, including impediments to quality data collection. Examples of shelter data include live release rates, disease frequency, length of stay, intake, outcome and other welfare and health measures
- Knowledge of basic epidemiologic measures of disease occurrence (e.g., cumulative incidence, incidence density, case-fatality, point and period prevalence) and their interpretation
- Knowledge and ability to produce and evaluate descriptive statistics including absolute numbers, rates, percentages, average, median, and other descriptive measures.
- Knowledge of measures of association (e.g., risk ratios, odds ratios) used to identify risk factors for disease in shelters
- Knowledge of estimation and importance of length of stay on disease frequency and on turnover time
- Familiarity with commonly used shelter software systems sufficient to perform data entry

B: Optimize Shelter Animal Behavioral Health

A comprehensive understanding of animal behavioral health is important to the shelter medicine specialist. Problem behavior is one of the most common causes of owner relinquishment of dogs and cats to animal shelters and shelter veterinarians need to understand the prognosis and methods for rehabilitation in a shelter setting. Shelter experts must be knowledgeable of how standardized assessments can aid in identifying behavioral characteristics (e.g. aggression) that ensure that safe pets are selected for adoption and how adoption matchmaking can be improved through history, observation and behavior evaluation. Stress reduction and enrichment programs are essential for welfare and must be incorporated as part of preventive medicine (wellness) protocols. Behavior problems and compromised welfare can easily develop in the stressful shelter environment, regardless of length of stay, and compromise both the behavioral and physical health of animals. Shelter medicine experts can help to decrease the risk of euthanasia in shelters by teaching staff to understand, recognize, and prevent stress and compromised welfare, by incorporating safe handling and restraint of animals, and overall by optimizing shelter animal behavioral health.

B-1 Promote acceptable quality of life (welfare) (88.2%)

Note on DACUM interpretation: This group interprets that this category implies an understanding of the concept of quality of life as it relates to dogs and cats.

- Detailed knowledge of physical needs of dogs and cats (e.g. "five freedoms"(freedom from 1) hunger and pain, 2) discomfort, 3) pain, injury or disease, 4) freedom to express normal behavior, freedom from fear and distress)), physical health, proper nutrition, potable water, proper housing, aerobic exercise, warmth, sleep, grooming, breed specific care)
- Detailed knowledge of behavioral needs of dogs and cats (e.g. sense of control, mental stimulation, social companionship, ability to cope, ability to play, consistent daily routines, ability to engage in species-specific behaviors like chewing and scratching)
- Detailed knowledge of environmental needs of dogs and cats (e.g. space, housing, light/dark cycles, temperature, ventilation, humidity)
- Detailed knowledge of behavioral signs of stress
- Detailed knowledge of behavioral manifestations of pain and illness
- Detailed knowledge of causes of stress in shelters
- Detailed knowledge of the role of enrichment strategies on behavioral health and quality of life for cats and dogs in shelters (e.g. aerobic exercise, play, training programs, human interaction, conspecific interaction, sensory enrichment, toys, feeding strategies, provision for species typical behavior like scratching, chewing and elimination needs, provision of behavioral options that allow an increased sense of control over the environment, consistent routines, population management, light/dark cycles and noise control)
- Detailed knowledge of the impact of quality of life on shelter animal health and disposition (e.g. adoption, euthanasia)
- Detailed knowledge of legal requirements for animal care and welfare in state(s) of most frequent practice
- Detailed knowledge of available professional guidelines for shelter cat and dog welfare (e.g. housing and care requirements)
- Knowledge of other professional guidelines for cat and dog welfare (e.g. housing and care requirements of laboratory animals, others)
- Knowledge of the major contributing factors to quality of life (e.g. social relationships, mental stimulation, health, stress, control)

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- Knowledge of physiologic signs of stress
- Knowledge of current models for measuring quality of life or welfare
- Knowledge of principles for maximizing/enhancing quality of life
- Knowledge of learning theory (e.g. classical and operant conditioning)
- Knowledge of species-specific animal behavior of dogs and cats (e.g. active and passive communication, body language and signaling, how animals perceive their world (e.g. unique sensory perception- olfactory, visual, auditory, tactile, pheromone), reproduction, parental care, behavioral development, socialization needs, feeding behavior, social structure, gender and age-related differences)
- Familiarity with how genetics and the environment affect behavior
- Familiarity with behavior patterns by species type (e.g. predator, prey)
- Familiarity with basic husbandry and behavioral needs of other pertinent species kept as pets (e.g. rabbits, other rodents, birds, reptiles, other)
- Familiarity with resources on basic husbandry and behavioral needs of other species
- Familiarity with resources for legal requirements for animal care and welfare for care in other states

B-2 Establish behavioral selection criteria for animal shelters (74.3%)
Note on DACUM interpretation: Establishing behavioral selection criteria relies on a solid foundation of detailed knowledge regarding varying shelter philosophies as they relate to the disposition of animals, shelter population management strategies, and the impact of availability of shelter resources as described elsewhere in this document.
- Knowledge of behavioral assessment techniques currently utilized in shelters (e.g. intake interviews, intake questionnaires, formal evaluation/assessment protocols, observation and documentation of behavior)
- Knowledge of existing research regarding canine/feline behavioral assessment
- Knowledge of impact of stress (housing and husbandry) on observed behavior
- Knowledge of legal liability associated with adopting out aggressive animals (e.g. bite history, observation of aggressive behavior in shelter)
- Familiar with typical behavioral characteristics of dog and cat breeds

B-3 Design stress management programs (73.5%)
- Detailed knowledge of causes of stress (particular stressors) in shelters
- Detailed knowledge of the impact of stress on physical and behavioral health and welfare
- Detailed knowledge of principles for preventing and minimizing stress
- Knowledge of the concept of stress and stressors for cats and dogs
- Knowledge of the major contributing factors to stress (e.g. social relationships, mental stimulation, physical and behavioral health, control)
- Knowledge of factors affecting the stress response (e.g. duration, severity, chronicity, novelty, predictability, ability to escape/control)
- Knowledge of factors that affect the ability of individual animals to cope with stress (e.g. personality type, age, breed characteristics, social experiences, level of socialization)
- Knowledge of current models for measuring stress

B-4 Design preventive behavior programs (72.3%)
- Detailed knowledge of behavioral causes of relinquishment
- Knowledge of strategies to prevent behavioral problems commonly associated with relinquishment of pets and those that develop in the shelter
- Knowledge of the relationship between dog training and pet retention

- Knowledge of puppy and kitten socialization programs
- Knowledge of veterinary behavior guidelines for puppy socialization and dog training

B-5 Develop behavioral assessment protocols (69.7%)

Note on DACUM interpretation: The committee interprets this to mean that the shelter medicine specialist should have knowledge of existing assessments and be able to advise on and implement their use.
- Knowledge of behavioral history taking
- Knowledge (competency) observing and interpreting behavior in the shelter (e.g. aggressive behavior, destructive behavior)
- Knowledge of behavioral assessment protocols
- Knowledge of research and limitations pertaining to behavior assessment protocols

B-6 Advise on diagnosis, prognosis, and treatment of common behavioral problems (69.0%)
- Knowledge of differential diagnoses (physical and behavioral) for causes of common behavior problems
- Knowledge of prognosis of common behavior problems
- Knowledge of diagnosis and treatment of behavioral problems that commonly develop in the shelter
- Knowledge of behavior modification and training techniques and tools for behavior problems that commonly develop in the shelter
- Knowledge of diagnosing and treating inappropriate elimination in cats
- Knowledge of treatment of medical problems, which are strongly related to behavior problems (e.g. feline lower urinary tract disease, endocrine disorders)
- Familiarity with diagnosis and treatment (including behavior modification and training techniques and tools) of behavioral problems commonly associated with relinquishment of pets
- Familiarity with basic psychopharmacology

B-7 Develop protocols for safe animal handling (68.3%)
- Detailed knowledge of safe/humane handling (e.g. capture, transport, restraint, examination, euthanasia)
- Detailed knowledge of equipment used for safe/humane handling (e.g. capture, transport, restraint, examination, euthanasia)
- Detailed knowledge of chemical restraint protocols and indications for use during capture, transport, restraint, examination, and euthanasia

B-8 Advise on adopter/animal compatibility (56.4%)
- Knowledge of the human factors related to relinquishment
- Knowledge of factors that affect adoption and retention
- Familiarity with adoption counseling and post adoption follow-up
- Familiarity with commonly used animal-adopter matching programs

B-9 Provide recommendations for companion animal training (50.2%)

Note: The knowledge required for B-9 is covered in the previous sections. No additional knowledge is required for this section.

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Section C: Protect Community and Public Health

Historically, animal shelters served to protect the public from rabies through control of stray animals, and protected animals through promoting legislation and enforcement of animal cruelty statutes. Although animal sheltering has changed dramatically since its beginnings more than a century ago, today's shelter medicine specialist must still have a thorough understanding of the interaction of humans and animals and the consequences of those interactions on human and animal health within the community. Shelters are anticipated to continue to play a central role in community veterinary public health protection, not only from rabies virus, cruelty, abuse and neglect, but from other existing and emerging zoonotic diseases and societal issues. Shelter medicine specialists require training in the protection of community and public health in order to best serve as advisors for shelters, their programs, and communities.

C-1 Design zoonoses control programs in animal shelters for immunocompromised and healthy people (82.9%)
- Detailed knowledge of common zoonoses affecting shelter dogs and cats, including prevalence, clinical signs, diagnosis, epidemiology, treatment and containment. Familiarity with zoonoses affecting other animal species
- Knowledge of zoonotic diseases and the veterinary role in prevention, recognition and response to such diseases for the protection of both animal and public health
- Knowledge and ability to develop comprehensive systems for preventing the spread of animal and human diseases in shelters, including housing, design, sanitation, barriers, prophylaxis, and record keeping
- Knowledge sufficient to identify animals at higher risk for zoonotic diseases and able to implement steps for animal and public health protection
- Knowledge of conditions associated with increased risk for zoonotic diseases in humans, including age, pregnancy, and immunosuppressive conditions
- Knowledge of public health recommendations and legal requirements for staff immunization. Detailed knowledge for jurisdiction of most frequent practice, awareness of resources to determine legal requirements for all areas
- Knowledge of federal, state and local regulations regarding management of zoonotic disease (e.g. which ones are reportable, vector wildlife species that cannot be relocated, etc.). Detailed knowledge for jurisdiction of most frequent practice, awareness of resources to determine legal requirements for all areas
- Familiarity with resources and able to advise on development of an education program to inform staff and volunteers of health risks of the shelter environment and needs for immunocompromised people to take extra precautions
- Familiarity with resources for implementation of a plan for immunizing staff with animal contact against rabies and tetanus
- Familiarity with resources for implementation of a plan, including training programs, to encourage safe volunteer involvement at the shelter
- Familiarity with the resources available for zoonosis information, including federal, state and county veterinary and public health agencies

C-2 Consult on zoonoses control programs in communities for immunocompromised and healthy people (67.6%)
Note on DACUM interpretation: This is interpreted as the shelter specialist should advise on the shelter's role in zoonoses control programs.
- Knowledge and ability to formulate recommendations for management of zoonoses within the shelter
- Knowledge and ability to provide community outreach, education and support related to effective management of free roaming populations of dogs and cats in the community as related to zoonotic disease risk and prevention

C-3 Consult on rabies control (74.3%)
- Detailed knowledge of the legal requirements for jurisdiction of most frequent practice for rabies quarantine and observation, vaccination, post-exposure rabies vaccination procedures, testing and record keeping to include knowledge of resources available
- Detailed knowledge of epidemiology of human, wild animal and domestic animal rabies, including defining exposures
- Detailed knowledge of the veterinary role in public health protection from rabies
- Knowledge of rabies prevention vaccine choices and delivery options
- Familiar with the legal requirements for all areas for rabies quarantine and observation, vaccination, post-exposure rabies vaccination procedures, testing and record keeping to include knowledge of resources available

C-4 Provide recommendations for dog bite prevention (63.6%)
- Detailed knowledge of legal requirements for dog bite reporting and animal disposition for jurisdiction of most frequent practice
- Detailed knowledge of restraint equipment and handling techniques sufficient to train staff and volunteers to avoid dog bites
- Familiar with incidence rates and risk factors of dog bite injuries and fatalities
- Familiar with legal remedies including pros and cons (e.g. dangerous dog and breed-specific laws)
- Familiar with resources for dog-bite prevention education
- Familiar with resources to determine legal requirements for dog bite reporting and animal disposition in all areas

C-5 Advise on dangerous animal issues (e.g. wildlife, exotics, domestic) (60.2%)
- Detailed knowledge of legal issues and resources surrounding dangerous animal ownership including wild, exotic or hybrid animals for jurisdiction of most frequent practice
- Detailed knowledge of resources related to safe handling and housing of dangerous dogs and cats, familiarity with resources for other species.
- Familiar with legal requirements for dangerous animal identification and management
- Familiar with resources for removal and management of dangerous and nuisance animals (wildlife)
- Familiar with legal issues and resources surrounding dangerous animal ownership including wild, exotic or hybrid animals

C-6 Participate in emerging, reportable & foreign animal disease surveillance and response (71.4%)
- Detailed knowledge of required notification procedures for reportable diseases in jurisdiction of most frequent practice
- Knowledge of emerging and reportable diseases, with emphasis on diseases of importance in North American shelter dogs and cats
- Knowledge and ability to train and educate others to identify potential risk factors and indicators for disease emergence (surveillance)
- Knowledge of proper biosecurity steps to take when emerging and reportable diseases are suspected, including quarantine, containment, documentation, testing, and follow-up
- Familiar with required notification procedures for reportable diseases

C-7 Consult on animal cruelty, abuse, and neglect (CAN) (75.9%)
- Detailed knowledge of legal definitions of cruelty, abuse, and neglect and the veterinarian's role in reporting for jurisdiction of most frequent practice
- Detailed knowledge of the CAN resources available, including safe havens, for jurisdiction of most frequent practice
- Knowledge of implications for veterinarians reporting abuse, including confidentiality requirements for medical records, immunity for reporting, mandated reporting laws, etc.
- Knowledge of general definitions of cruelty, abuse, and neglect
- Knowledge of the warning and physical signs of abuse and guidelines for reporting or education
- Knowledge of proper procedures for investigating and reporting CAN
- Knowledge of animal fighting laws, detailed for jurisdiction of most frequent practice, awareness of resources to determine legal requirements for all areas
- Knowledge of forensic investigations, including how to recognize, collect, preserve, and document evidence, including chain of evidence management, record keeping and generation of reports
- Knowledge of gross necropsy techniques and interpretation, familiarity with resources for special forensic necropsy techniques
- Knowledge of proper testimony techniques
- Knowledge of animal hoarding issues, including psychological concepts and ability to assist in the development of a plan for a multi-agency hoarding intervention with seizure and management of large numbers of animals
- Knowledge and ability to assist in the development of a plan for holding animals seized in legal investigations, with emphasis on veterinary care, infection control and animal welfare
- Knowledge of the link between human and animal violence, including children, elders, etc.
- Familiar with resources for legal definitions of cruelty, abuse, and neglect and the veterinarian's role in reporting
- Familiar with managerial issues when animals are seized in legal investigations, including needs for legal documentation, security, cost-containment, and disposition of the animals
- Familiar with resources for humans involved in CAN situations, including safe havens, etc.

Section D: Alleviate Companion Animal Homelessness

The shelter medicine specialist should be a central source of knowledge and information in addressing animal homelessness on a community level. Solutions to the problem of companion animal homelessness require knowledge of the risk factors that may cause animals to enter shelters and awareness of potential community interventions. Shelter medicine specialists must be qualified to aid communities in developing and implementing data driven strategies to decrease the number of unwanted companion animals.

D-1 Serve as resource on epidemiology of companion animal homelessness (83.6%)
- Detailed knowledge of reasons that animals enter shelters
- Knowledge of methods to decrease overpopulation, methods to assess success, research regarding impact of these approaches (e.g. spay/neuter legislation, high- quality high-volume spay/neuter, trap-neuter-return)
- Knowledge of the philosophical and logistical differences of various sheltering strategies
- Familiarity with shelter software sufficient to analyze predominant sources and types of shelter admissions and dispositions
- Familiarity with resources to assist in the design of intervention programs to reduce companion animal homelessness
- Familiarity with resources to develop a community animal population and welfare assessment

D-2 Design high-quality spay/neuter programs (79.7%)
- Detailed knowledge of veterinary medical guidelines for spay/neuter programs
- Detailed knowledge of various models for spay/neuter services
- Detailed knowledge of the regulatory requirements for spay/neuter programs for jurisdiction of most frequent practice, awareness of resources to determine legal requirements for all areas
- Detailed knowledge of determination of gender and reproductive status for common species in shelters, including physical and diagnostic tests (e.g. determining whether or not female is spayed, pregnant)
- Knowledge and ability to develop veterinary components of high-quality high- volume spay/neuter programs
- Knowledge of the costs of neutering programs, including facility overhead, staff, and medical expenses

D-3 Knowledge of non-surgical sterilization of companion animals (63.2%)
- Knowledge of currently available nonsurgical contraception, including application, safety, method of action, duration of effect
- Familiar with resources for information on additional areas of current research

D-4 Advise on humane education programs (60.1%)
- Familiar with resources for humane education including the need for companion animal sterilization, proper animal care, role of animal shelters in the community and selection of appropriate pets.

D-5 Provide for companion animal surrender intervention programs (59.2%)
- Detailed knowledge of owner and animal risk factors for relinquishment
- Detailed knowledge of reasons for pet relinquishment

- Detailed knowledge of owner search methods for lost pets
- Familiar with resources for prevention and intervention

D-6 Design animal-owner reunification programs (54.2%)

Note on DACUM interpretation: This was interpreted as advise on rather than design.
- Knowledge of microchip identification systems, including international microchip and scanner compatibility issues, proper implantation and interrogation of microchips, use of microchip databases and related regulatory issues.
- Familiar with patterns of pet loss and owner search methods
- Familiar with resources for pet reunification, including Internet, print media, and shelter outreach

D-7 Design shelter animal transfer programs (57.9%)

Note on DACUM interpretation: This was interpreted as advise on rather than design.
- Detailed knowledge of issues for transferring and receiving shelters regarding infectious disease prevention and intervention, including risk of transmission of new diseases to non-endemic areas
  - Knowledge of shelter population dynamics that encourage shelter transfers
- Knowledge of the welfare issues associated with shelter transfer programs with consideration of physical health, behavioral health, transportation regulations and safety
- Familiar with animal inspection and movement laws, including health certificates, quarantines, record keeping and transfer of ownership. Detailed knowledge for jurisdiction of most frequent practice, awareness of resources to determine legal requirements for all areas, including international

D-8 Participate in disaster planning and response

Note: This bullet item was not included in the original DACUM or survey, and therefore is not assigned a weighted score.
- Knowledge of and ability to assist in the development of a shelter disaster preparedness plan with an emphasis on sections that apply to veterinary care, infection control, and welfare
- Familiarity with the system for local, regional, state, and national disaster response reporting and coordination Familiarity with and ability to participate in disaster response
- Familiarity with the requirements for and ability to assist in the design of a temporary shelter and standard operating procedures for animal care, identification and triage in a mass disaster, with an emphasis on veterinary care and infection control
- Familiarity with procedures and issues associated with temporary housing of pets for displaced families and co-housed human-animal shelters

Section E: Facilitate Animal Shelter Management

In order to facilitate evolution of health care policies and procedures in any shelter, the shelter medicine specialist must understand a complex web of factors that may affect a shelter's ability to implement specific recommendations. Shelter animal health is directly affected by the structure of shelter leadership, management, and staffing. Shelter medicine specialists can provide valuable input regarding strategic planning, resource and budget allocation, and personnel issues as they impact animal health. Shelter specialists must know how to monitor a population of animals through tracking individual animals, legal record keeping, and compliance with health related, shelter, and veterinary medical regulations in order to facilitate animal shelter management best practices.

E-1 Advise on resource allocation in shelter (e.g. personnel, budget) (62.2%)
- Knowledge of how shelter boards function with regards to resource allocation (e.g. such that veterinarians understand that Boards can allocate proportionately more funding to medical/behavioral programs)
- Knowledge of the funding process for municipal and shelters with animal control contracts
- Knowledge of costs and general funding strategies for spay/neuter and medical services within shelters (e.g. fee for service, grants, municipal funding)
- Knowledge of principles and ability to perform cost (risk)/benefit analysis to a wide variety of practical shelter situations, including impact of time, personnel, and dollar costs on shelter resource investments (e.g. cost of days of care versus cost of additional personnel to reduce days of care)
- Familiarity with organizational structures of a wide variety of shelters with regards to their resource decision-making process
- Familiarity with principals and methods of cost/benefit analysis including personnel and space as well as financial resources
- Familiarity with budgets of shelters: overall shelter budget, veterinary budget, per capita spending on animal sheltering programs and national and regional variations in budgets

E-2 Design animal identification, tracking and data analysis systems (56.2%)
Note on DACUM interpretation: The committee took this section to refer specifically to tracking individual animals through the shelter system. Broader data analysis issues are addressed in section A-18, shelter data analysis and interpretation.
- Knowledge of characteristics of adequate animal tracking systems in shelters (e.g. unique, physical identifiers such as neck collars, animal ID numbers, visible gender indications such as colored collars, use of shelter software for animal location, role of microchips, photographs)
- Knowledge of microchip identification systems as described in section D-6 (Design animal-owner reunification systems)
- Knowledge and ability to produce shelter animal inventory using hand count or common shelter software, knowledge of common issues with inventory quality (e.g. animals lost in foster care, failure to record dispositions)
- Knowledge of methods for tracking history of animal movement within shelter using paper records or shelter software
- Familiarity with range of practices for animal tracking in shelters including software systems, physical identification, electronic options; other potential models (e.g. laboratory and zoo models)

E-3 Advise on legal medical record keeping in shelters (67.4%)
- Knowledge of legal requirements for medical records with detailed knowledge of the requirements of record-keeping in the state where residents are training
- Familiarity with how to find the legal requirements for record-keeping for all states

E-4 Consult on animal shelter regulations (OSHA, DEA) (66.4%)
Note on DACUM interpretation: the DACUM intended this to refer specifically to DEA and OSHA, but the committee additionally interpreted "animal shelter regulations" as they relate to veterinary medicine
- Knowledge of any restrictions for veterinary practice in shelters
- Knowledge of the legal ownership status of sheltered animals and associated implications for delivery of veterinary care

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- Familiarity with OSHA and DEA regulations pertaining to shelters

E-5 Advise on compassion fatigue in shelters (59.3 %)
- Knowledge of definition, causes, identification of compassion fatigue
- Familiarity with resources regarding compassion fatigue in order to direct personnel to available resources

E-6 Serve as a resource for liability issues
Note: This bullet item was not included in the original DACUM or survey, and therefore is not assigned a weighted score.
- Detailed knowledge of the Veterinary Practice Act in resident's state pertaining to the practice of veterinary medicine and familiarity with issues generally covered by many state practice acts
- Knowledge of the requirement for veterinarians to report cruelty, abuse and neglect of children and animals, and the liability or lack thereof associated with reporting; familiarity with the variation of the laws pertaining to reporting in other states
- Knowledge of liability associated with improper handling and record-keeping with regards to controlled substances in shelters
- Familiarity with resources to determine liability associated with adoption of dangerous animals by shelters
- Familiarity with resources to determine liability associated with placement of animals with medical disorders or infectious diseases
- Familiarity with resources to determine liability associated with not providing adequate health documentation for animals involved in interstate transport
- Familiarity with resources to determine liability relating to providing veterinary services during disasters in states where the attending veterinarians are not licensed
- Familiarity with resources to determine liability relating to failure of shelters to provide adequate knowledge and training (to staff, volunteers and the public) to minimize their risk of zoonotic diseases in the shelter
- Familiarity with resources to determine liability relating to failure of shelters to provide adequate training of staff and volunteers regarding safe animal-handling and management
- Familiarity with state laws that proscribe minimum standards of care for sheltered animals and with other state laws regarding shelter management such as the Hayden Law; familiarity with the liability relating to failure to comply with these laws
- Familiarity with liability relating to breaches of confidentiality in written and verbal communication
- Familiarity with shelter's insurance coverage (e.g., amount and coverage) as it pertains to the issues above

Section F: Serve as a Resource on Animals and Public Policy

Shelters medicine specialists should provide a sophisticated understanding of the broad health and welfare implications of legislative and ethical decisions pertaining to shelter animals. In order to best serve as a resource and facilitate efficient responses to animal issues involving shelters, shelter medicine specialists need to be capable of delving into the inter-relationships of animal agencies within a community. This requires a solid foundation in the overall history of animal sheltering, animal welfare, legislative process and the veterinary role in sheltering as well as sources of common conflict in animal welfare. Shelter medicine specialists are in a unique position to serve as a resource between the veterinary community, the humane community, and the public to promote functional and productive working relationships and advise effectively on development of new programs.

F-1 Provide expertise on legislative items and policies related to animals (66.2%)
- Detailed knowledge of existing and proposed local and state laws that may impact animal shelters or animal populations; familiarity with resources regarding legislation in other jurisdictions
- Familiarity with legislative process (e.g. how new animal-related laws are developed and implemented)
- Familiarity with the sources of information regarding state and federal animal- related laws
- Familiarity with organizations responsible for regulation of animal shelters, pet stores, breeders, and rescue groups, and sanctuaries

F-2 Serve as a resource for shelters on animal regulatory issues and agencies (e.g. USDA, Fish and Game, Wildlife) (54.7%)
- Familiarity with role played by each agency
- Familiarity with issues relating to non-indigenous exotic animals and laws pertaining to ownership/sheltering of these animals

F-3 Provide expertise regarding community animal programs (58.1%)
- Detailed knowledge of web-based, written and other resources regarding development of community animal programs (e.g. resources for development of high volume spay/neuter programs, feral cat management programs)
- Detailed knowledge of programs within the community providing subsidized spay/neuter and other veterinary care in order to refer citizens to these programs
- Detailed knowledge of all shelters, their types and their programs in the resident's community
- Familiarity with the range of community programs in existence, (e.g. spay/neuter programs, feral cat programs, rescue organizations, advocacy for animal-friendly housing, support services for low-income owners)
- Familiarity with the resident's local community's rescue organizations, feral cat programs and other programs

F-4 Provide information on animal shelter history, trends and programs (61.3%)
- Detailed knowledge of historical relationship between shelters and veterinarians
- Familiarity with origin and history of significant trends such as LES (Legislation/Education/Sterilization) and No-Kill
- Knowledge of history of animal shelters including origination of sheltering in the United States (municipal/public health versus private/animal advocacy)

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- Knowledge of national animal sheltering organizations
- Familiarity with range of funding options for shelters (e.g., animal control, grants, fund-raising)

F-5 Provide animal health and welfare expertise concerning ethical issues in shelters (75.8%)
- Knowledge of the definition of ethics, process for assessing ethical issues and awareness of resources regarding veterinary and shelter ethical issues
- Familiarity with the range of shelter practices where ethical conflict often arises (e.g. euthanasia, animal care, legal issues)
- Familiarity with process for developing guidelines regarding potentially ethically controversial practices in shelters (e.g. development of euthanasia guidelines)

Section G: Advance Animal Shelter Medicine

Pet homelessness and animal welfare concerns are global issues. Animals in shelters are a population at extremely high risk for infectious disease and death. More animals die from euthanasia annually in the United States than from any other disease or malady, yet shelter animals are a population for which veterinary medicine has few dedicated resources—including few trained specialists. Residents completing shelter medicine programs will advance the field of shelter medicine by enhancing educational opportunities for students, veterinarians and shelter professionals; contributing to research to benefit shelter animals; educating the veterinary community and public regarding the scope and practice of shelter medicine; and promoting the development of the specialty through professional service and activities.

G-1 Promote development of shelter medicine education curricula (89.4%)
- Knowledge of and ability to create and deliver educational content via didactic lecture, practical experience, and written material
- Familiarity with the content and variation within historical and existing academic curricula (e.g. within core and elective context, didactic and practical, variations across training programs)
- Familiarity with continuing education offerings at major veterinary and shelter conferences
- Familiarity with technological resources for distance learning

G-2 Contribute to research in shelter medicine (88.7%)
- Detailed knowledge sufficient to conduct, present and submit a resident research project for publication
- Knowledge regarding funding sources and grant writing process for research support
- Knowledge of and ability to evaluate research performed by others including appropriateness of design, analysis, and application.
- Knowledge of how to interpret published statistical evaluation of shelter medicine related data
- Knowledge of and ability to evaluate data quality including validity and reliability
- Knowledge of research project design and ability to design and conduct a research project
- Knowledge of research designs for epidemiologic studies
- Knowledge of how to formulate a research question
- Knowledge and application of basic statistical techniques used frequently in biomedical research
  - Ability to calculate and interpret appropriate summary statistics for categorical and continuous data
  - Ability to interpret p values and knowledge of statistical power

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- o   Ability to interpret confidence intervals
- o   Familiarity with the component parts of sample size estimation techniques for categorical and continuous data
- o   Knowledge of basic comparative statistical techniques for categorical and continuous data between two or more groups (parametric and non parametric)
- o   Ability to interpret correlation coefficients and results from simple linear regression analyses
- Familiarity with existing body of research in shelter medicine

G-3 Educate veterinary and shelter community regarding shelter medicine (88.6%)
- Knowledge of and ability to speak before the public and other veterinarians
- Knowledge of the issues facing veterinarians when working with shelter administration and staff in various capacities
- Knowledge of the expectations shelter directors hold for shelter veterinarians
- Knowledge of evolution of other population health specialties such as food animal herd health, and changing attitudes of producers towards veterinary services in those fields.
- Familiarity with historical and current issues creating tension between private practice veterinarians and shelter veterinarians and administrators

G-4 Communicate with the public as an expert in shelter medicine issues (88.6%)
- Knowledge of and ability to communicate in writing and verbally with the media
- Knowledge of shelter medicine-related issues most commonly affecting communities (e.g., breed bans, mandatory S/N) and ability to serve as a resource for community members
- Knowledge of who influences animal welfare-related issues in communities (e.g., city councils, town boards)

G-5 Pursue professional development in shelter medicine (91.6%)
- Detailed knowledge of the resources for professional development (e.g. websites, books, continuing education meetings, Association of Shelter Veterinarian's *listserv*, Veterinary Information Network)
- Knowledge of resources available from other shelter medicine programs
- Familiar via personal attendance of at least one national shelter medicine meeting each year

Section H: Develop effective means of communication

In order to be an effective shelter medicine specialist, verbal and written communication skills are essential. Open and collaborative verbal communication has been linked to positive patient outcomes, increased compliance, higher job satisfaction and decreased staff stress. These outcomes are desirable in shelter settings, and residents should be equipped with the proper background and skill to aid in their achievement. Medical recordkeeping and reporting are critical skills that shelter medicine specialists use to demonstrate care, to communicate directly, to record data for current use and retrospective review and to establish documentation for legal purposes. Shelter medicine residents need to develop strong communication skills in order to convey their knowledge in an effective manner, thereby advancing shelter medicine.

H -1 Enhance Basic Communication
Note: This bullet item was not included in the original DACUM or survey, and therefore is not assigned a weighted score.
- Knowledge of the use of the medical record as a communication tool (see H2)
- Knowledge of and ability to use the consultation report as a communication tool

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- Familiarity with variety of management structures and approaches in shelters with respect to appropriate communication channels
- Familiarity with relevant resources for training shelter staff in the subject matter defined throughout this document
- Familiarity with communication styles and personality types with respect to communication challenges (e.g. Myers Briggs, DiSC)
- Familiarity with types of communication skills utilized for successful negotiation, conflict resolution, diplomacy and successful communications.
  - Content skills
  - Process skills
  - Perceptual skills
- Familiarity with of four core communication skills
  - Recognition of non-verbal cues
  - Open-ended questioning
  - Reflective listening
  - Use of empathy
- Familiarity with of the skill of active listening
- Familiarity with application of above communication skills in relation to:
  - Handling euthanasia (with staff, volunteers, administration and others)
  - Compassion fatigue and other human stressors
  - Day-to-day workings of shelter
- Familiarity with media
  - Familiarity with print, electronic, radio and TV media objectives
  - Familiarity with talking to and working with the media
- Familiarity with organizing material and utilizing software for formal presentations
- Familiarity with the concepts of confidentiality as applied to written and verbal communication

H-2 Develop medical record keeping systems (73.3%)

Note on DACUM interpretation: This areas of activity was originally categorized in the DACUM under Section A, Optimize Shelter Animal Physical Health. It was moved to this section to emphasize the importance of the medical record as a communication tool.

- Detailed knowledge of state reporting (reportable diseases, suspected abuse) for state of practice
- Familiarity with state reporting (reportable diseases, suspected abuse) for other states
- Knowledge of and ability to use most commonly used shelter software systems for medical record keeping, including reports available
- Knowledge and ability to advise shelters on the use of medical records database for population and individual animal health management
- Knowledge of minimum and ideal content of medical records
- Knowledge of how to design a paper-based record keeping system
- Knowledge of the advantages and disadvantages of electronic versus paper records
- Knowledge of local practice acts
- Knowledge of federal and state requirements for drugs logs which must be recorded and kept (drug logs)
- Knowledge of the requirements and process for recording other routine events (e.g. anesthesia and surgery reports)
- Knowledge of how to create a report of findings from shelter consults or investigations, including overview, objectives, observations and recommendations

APPENDIX A

Development of the Composite Score for Responses to the DACUM-based On-line Survey

A composite score was developed from the responses of the DACUM-based survey, combining answers to the overall importance, responsibility and frequency sections *for each task.* The composite score for that task was developed as follows:

The mean score for each task for shelter specialist respondents was calculated for each section of the survey - overall importance, responsibility and frequency. These mean scores were then weighted according to the following formula: (O.25 X mean frequency score) + (O.25 X mean responsibility score) + (0.5 X mean overall importance score) for each task. This score was then converted to a percentage of the total possible score if all respondents had rated that task at its highest possible score. (The total possible score for each task was 5 (expert) for Responsibility, was 4 (very frequently) for Frequency and was 5 (of great importance) for Overall Importance.)

Example: if the mean frequency score for overall importance for a task was 4.6, for frequency it was 3.7 and for responsibility it was 4.3 then the composite score for that task was [(0.25 X 3.7) + (0.25 X 4.3) + (0.5 X 4.6) = 4.31. This score was then divided by the total possible composite score of 4.75 for that task and multiplied by 100 to get a percentage of the highest possible score. In this example the composite score was (4.31 / 4.75) X 100 = 90.7%.

<u>Composite Scores</u>
Percentage of total possible composite score
Based on 0.5(Importance)+0.25(freq)+0.25(responsibility)

% of total possible score from equation above (4.75)

Task	S. Speclst
Design infectious disease protocols	92.8%
Pursue professional development in shelter medicine	91.6%
Design vaccination protocols	91.5%
Design biosecurity procedures	91.2%
Design sanitation and disinfection protocols	90.9%
Promote development of shelter medicine education curricula	89.4%
Contribute to research in shelter medicine	88.7%
Communicate with the public as an expert on shelter medicine issues	88.6%
Educate veterinary and shelter community regarding shelter medicine	88.6%
Diagnose disease outbreaks	88.2%
Promote acceptable quality of life	88.2%
Manage disease outbreaks	87.2%

Advise on population management and density in shelters	86.7%
Create medical and surgical protocols	85.3%
Serve as resource on epidemiology of animal homelessness	83.6%
Design disease surveillance programs	83.5%
Design zoonoses control programs	82.9%
Recommend husbandry standards	82.4%
Educate multiple constituents on animal CAN recognition and reporting	81.9%
Design high quality, high volume spay/neuter programs	79.7%
Consult on facility/housing design and management	79.7%
Serve as an expert witness for animal CAN cases	76.0%
Consult on animal cruelty, abuse and neglect	75.9%
Provide expertise on animal shelter ethical issues	75.8%
Advise on medical selection criteria within shelters	75.5%
Maintain optimal environmental conditions in shelters	75.5%
Provide forensic expertise for animal CAN investigation	75.3%
Establish behavioral selection criteria for shelter animals	74.3%
Consult on rabies control	74.3%
Design stress management programs	73.5%
Develop medical record keeping systems for shelters	73.3%
Collaborate with external agencies regarding animals and public health	72.8%
Design preventive behavioral programs	72.3%
Design euthanasia protocols	71.7%
Participate in emerging, reportable and foreign animal disease surveillance	71.4%
Consult on disaster relief and preparedness	70.8%
Develop behavioral assessment protocols	69.7%
Advise on diagnosis, prognosis, and treatment of common behavioral problems of shelter animals	69.0%
Design protocols for individual patient care	68.9%
Develop protocols for safe animal handling	68.3%
Consult on zoonoses control programs in communities	67.6%
Advise on legal medical record keeping in shelters	67.4%
Consult on animal shelter regulations (OSHA, DEA)	66.4%
Provide expertise on legislative items and policies related to animals	66.2%
Provide recommendation for dog bite prevention	63.6%
Design safe field triage/capture/handling/transport protocols	63.2%
Advance non-surgical contraception of companion animals	63.2%

Advise on resource allocation in shelters	62.2%
Design nutrition programs for shelter animals	61.4%
Provide information on animal shelter history, trends, and programs	61.3%
Provide humane animal capture, transport and housing for CAN animals	60.9%
Advise on dangerous animal issues	60.2%
Advise on humane education programs	60.1%
Advise on compassion fatigue in shelters	59.3%
Provide for companion animal surrender intervention programs	59.2%
Provide expertise regarding community animal programs	58.1%
Design shelter animal transport programs	57.9%
Advise on animal shelter environmental impact	56.9%
Advise on adopter/animal compatibility	56.4%
Design animal identification and tracking and data analysis systems	56.2%
Manage animal CAN victim rehabilitation	55.6%
Serve as a resource on animal regulatory issues and agencies	54.7%
Design animal/owner reunification programs	54.2%
Provide recommendations for companion animal training	50.2%

Communication

Shelter data analysis and interpretation