United Spay ALLIANCE

Decrease their numbers. Elevate their status. End their homelessness.

United Spay Alliance HQHVSN Surgeon Checklist
Patient Care and Clinical Procedures

This document is a checklist of key statements from ***The Association of Shelter Veterinarians' 2016 Veterinary Medical Care Guidelines for Spay-Neuter Programs*** for use as a checklist for surgeons and High Quality-High Volume Spay/Neuter (HQHVSN) training. It has been distilled down to items that just pertain to the surgery and the surgeon. There are a few ancillary items included that closely relate to the actual surgery or patient care. This checklist, and the document that it is derived from is broken down into six sections:

Guidelines for Patient Care and Clinical Procedures
Guidelines for Preoperative Care
Guidelines for Anesthetic Procedures
Guidelines for Surgical Care
Guidelines for Postoperative Care
Guidelines for Operations Management

Not every section is included in this checklist, only items that are related to surgery or patient care, including some ancillary items that the surgeon should be cognizant of. This document is a checklist, a list that HQHVSN surgeons can review and adhere to in order to perform at the level required by the United Spay Alliance.

Guidelines for Patient Care and Clinical Procedures

Record keeping

Record-keeping procedures **should** comply with federal, state, and local laws and regulations. A medical record **should** be prepared for each animal and **should** include

- physical examination findings
- body weight
- information on all drugs prescribed and administered (including doses and routes of administration)
- the surgical procedure performed

- any abnormalities identified
- any other pertinent information regarding the animal's condition

Standardized operative reports **may** be used but **should** allow for additions when necessary.

Patient handling and housing

Proactive strategies to decrease patient stress and fear while promoting patient comfort are **essential** components of patient care in all clinical settings. Among these strategies, safe, low-stress handling is a key requirement for animal health and well-being.

- Dogs that do not walk willingly on a leash **should** be carried when possible.
- Cats exhibiting signs of fractious or feral behavior **should** be transported in covered traps or other transport carriers.

Procedures for temporary housing of patients before and after surgery **must** be designed to enhance safety and comfort through the following recommendations:

- A system **must** be in place for identification of individual animals.
- Housing **must** allow for adequate temperature control and ventilation and stress reduction.
- Species **should** be separated to the extent possible.
- Noise and other environmental stressors, such as barking, loud music, and unnecessary foot traffic, **should** be minimized.
- Housing **must** be properly cleaned and disinfected between patients.
- Tractable adult animals **should** be housed in individual cages or runs or portable crates or pet carriers that allow for good visibility and adequate space to stand and turn around as well as for safety at various stages of sedation and anesthesia.
- At the discretion of the attending veterinarian, littermates or housemates **may** be housed together or with their mothers before the administration of sedation or anesthesia.
- Intractable or feral animals **should** be housed in traps or other enclosures that allow for the administration of anesthetics without extensive handling to minimize animal stress and maximize handler safety.
- Intractable or feral animals **should** only be removed from their traps or enclosures after sedation.

Handling and movement of sedated and anesthetized patients warrant special considerations.

- The head and neck **should** be supported and maintained in straight alignment with the patient's body to promote optimal airway patency.
- The patient's torso **should** be continuously supported to avoid stressing joints.
- Patient comfort **should** be continuously addressed by ensuring proper thermoregulation and managing stress and pain.

Infectious disease control procedures

Reducing the potential risk of infectious disease exposure for patients undergoing spay-neuter surgery is a crucial priority.

- Patients **should** be observed for signs of infectious diseases, from initial patient contact until discharge.
- When signs of infection are identified, the patient **should** be segregated from other patients for their clinic stay.
- Standard procedures for cleaning, disinfection, and containing potential infectious diseases **should** be established and regularly practiced.

Spay-neuter Programs **should** include the following biosecurity measures:

- Between each patient, all equipment with direct patient contact, **should** be thoroughly cleaned and disinfected with agents known to destroy common veterinary pathogens.
- Anesthetic equipment **should** be inspected, cleaned, and maintained on a schedule commensurate with surgery volume.
- Staff **should** wash or sanitize their hands or change gloves between patients and litters.
- If determined to be appropriate, surgical candidates with clinical signs consistent with contagious infectious disease **should** be scheduled to undergo surgery following completion of procedures on all healthy animals.

Preparation for emergencies

- A veterinarian **should** be present and available to triage and address complications that might occur during anesthesia, surgery, or the immediate postoperative period.
- Clinic staff and volunteers **should** be trained to recognize emergencies.
- Designated clinic staff trained in cardiopulmonary resuscitation **should** be available to provide life support if required.
- Standard emergency equipment, including a source of oxygen and means of ventilation and emergency drugs and reversal agents dated for current use **must** be readily available in ample supply in all situations.
- Emergency drug charts containing volumes of drugs to be administered by body weight **should** be readily accessible.

Follow-up and emergency care

- Spay-neuter programs **must** establish regular policies for managing complications and emergencies that occur after surgery.
- The program **should** perform its reexamination, if possible.
- For MASH-style and mobile unit programs, contingencies for emergency veterinary care **must** be arranged in advance.
- In the event of inpatient death, the owner, caregiver, or duly authorized agent **should** immediately be notified and permission to perform a necropsy **should** be requested.
- Patient discharge instructions **should** indicate that the clinic **should** be contacted regarding postoperative concerns or problems that may arise.

    - In the case of patient death following discharge, a necropsy **should** be performed if possible to determine the cause of death.
- The necropsy **may** be completed by a neutral source such as a diagnostic laboratory or by the clinic veterinarian with appropriate documentation.

Guidelines for Preoperative care

Patient selection

Patient selection will vary depending on clinic staff, anesthetic capabilities, locale, technical training, and economics. A veterinarian **should** make the final decision regarding the acceptance of any patient for surgery with acceptance-based on

- historical examination findings
- physical examination findings
- the program's surgical schedule

Veterinarians **must** weigh the risks and benefits of neutering patients with mild infectious or noninfectious medical conditions.

Client communication

A patient history **must** be obtained including:

- Current health status
- Current clinical signs of disease
- Current medications and supplements
- Previous vaccinations
- Pre-existing medical conditions
- Previous adverse reactions

Consent forms **should** be signed by clients or their duty-authorized agents before the initiation of anesthesia.

Clients **must** be informed of surgical and anesthetic risks and **must** consent to anticipated procedures.

The specific topics contained in the consent form may vary from one program to the next, but some topics to consider including are:

- Client confirmation of patient's health.
- Acknowledgment of the risk of infectious disease exposure
- Acknowledgment of the risks of anesthesia and surgery, including death.
- Acknowledgment of the risks of transport.

- Authorization for surgery and other procedures.
- A description of fees.
- Notification of any permanent identification procedures, including tattooing, ear tipping, and microchipping.
- Client contact information.
- Recommendation that ongoing health care be provided by a full-service veterinary clinic.

Withholding food

Food **should** be withheld from all animals for an appropriate period before surgery. Withholding water is not necessary and **not recommended**.

- For pediatric animals (*i.e.,* animals between 6 and 16 weeks old), a small meal **should** be fed 2 to 4 hours before surgery, and food **should not** be withheld for > 4 hours before surgery.
- For juvenile and adult animals (*i.e.,* animals > 16 weeks old), food **should** be withheld for a minimum of 4 hours.

Overnight fasting is acceptable but withholding food for longer than 6 hours is not necessary.

- Exceptions to minimum fasting periods **may** be made for feral cats in traps.

Physical examination

A veterinarian or supervised veterinary student **should** perform a physical examination to qualify an animal as a surgical candidate.

- Physical examinations **should** be performed before an animal is anesthetized. Anxiety, aggression, or feral behavior may prevent a thorough assessment before sedation or induction of anesthesia.
- Physical examination **should** include verification of sex and reproductive status.
- Body temperature **may** or may not be measured but is at the discretion of the attending veterinarian.
- Preanesthetic diagnostic testing **may** or may not be performed at the attending veterinarian's discretion.
- Body weight **should** be determined as close to the time of surgery as possible. When body weight is not feasible, body weight **should** be estimated as accurately as possible.

Guidelines for Anesthetic Procedures

Perioperative thermoregulation

For most patients undergoing neutering through a spay-neuter program, there is a considerable potential for hypothermia.

- Efforts to maintain normal body temperature **should** be made from the time of patient admission until discharge.
- Before premedication and induction of anesthesia, ambient temperature, and humidity **should** be controlled to keep animals comfortable.
    - Drafts **should** be avoided, and animals **should** be kept dry.
    - Contact with cold surfaces **should** be minimized to the extent possible
    - During patient preparation for surgery, excessive removal or moistening of the hair around the surgical site **should** be avoided, and a warmed preparation solution **should** be used to minimize heat loss.

The **recommended** ambient temperature range for housing cats and dogs is between 18° and 28°C (64° and 84°F) with a temperature setting in the low to mid 70s being typical.

- The temperature setting and amount of bedding material used for insulation **should** be tailored to the needs of individual animals.
- Animals recovering from anesthesia often require warmer environmental temperatures, and sick, frail, and pediatric patients **may** require warmer temperatures than healthy animals.
- If needed, supplemental heat sources **should** be used, but care **must** be taken to prevent hyperthermia and thermal burns.

Active patient warming can be achieved using heated surgical tables, semiconductive polymer fabric heating blankets, circulating warm water blankets, and warm air blankets.

Anesthesia equipment

The anesthesia equipment used in spay-neuter programs is generally the same as that used in any veterinary practice setting. However, when equipment is used in a high-volume setting, special consideration **should** be given to its use and maintenance to enhance patient safety.

All anesthesia equipment **should** be prepared and checked daily, before use. This equipment includes:

- Endotracheal tubes
- Laryngoscopes
- Anesthesia machines
- Monitors

All programs **should** develop and implement a regular maintenance schedule for equipment.

- Heavily used equipment in high-volume programs **should** be serviced more frequently.
- Anesthesia machines and monitors **should** be maintained following manufacturers' recommendations.
- Carbon dioxide absorbents **should** be checked and changed regularly.

Higher volumes of patients dictate increased frequency of changing and cleaning of canisters.

- When canisters are used, they **must** be carefully monitored, weighed regularly, and discarded after their effective service life**.**

Oxygen supplementation and ventilation strategies

While not required for all patients, oxygen supplementation, including before and after surgery, is **recommended** for high-risk patients.

- The ability to provide oxygen supplementation when medically indicated is a requirement for all spay-neuter programs.
- Oxygen flow rates for oxygen delivered through endotracheal tubes **should** be adequate and specific for the rebreathing or non-rebreathing circuits being used.

Airway management

- Airway management devices **should** be properly fitted and carefully secured in place. Tape or ties made from plastic tubing, gauze, or other materials are acceptable for this purpose.
- Intubation provides patients with a usable, patent, artificial airway but does not necessarily imply the use of oxygen or inhalant anesthetics.
- The benefits of intubation **must** be weighed against the potential detriments for all patients undergoing spay-neuter surgery.

Fluid therapy

Fluid administration is not required for all elective surgical procedures.

- Fluid supplementation is **recommended** for high-risk patients.
- The ability to provide IV fluid administration when medically indicated is **required** for all spay-neuter programs.
- When used fluids **should** be administered following current veterinary medical guidelines for fluid therapy.

Monitoring

Patient monitoring is **essential** for safety as well as ensuring the maintenance of a safe and adequate plane of anesthesia. Monitoring of several variables is required to accurately assess the plane of anesthesia.

- Each patient **should** be carefully monitored beginning at the time of administration of premedications or anesthetic agents and continuing until the conclusion of the recovery period.

Monitoring **should** involve the assessment of various combinations of vital parameters.

- Pulse quality, rate, and rhythm—It is important to directly monitor patient pulse quality.

- Respiratory rate and pattern—Monitoring respiratory rate and pattern is particularly useful in the early identification of anesthetic problems.
- Jaw tone- Pediatric puppies normally lack mandibular tone, therefore jaw tone **should not** be used to assess anesthetic depth in these patients.
- Mucous membrane color and capillary refill time are subjective assessments of perfusion but **should not** be used as sole indicators of adequacy of circulation

The use of various types of equipment can enhance patient monitoring, such equipment use **should not** serve as a substitute for continual monitoring by trained staff.

Anesthetic protocol

Selecting anesthetic protocols for spay-neuter programs depends on many factors, including the number and type of patients, the skill and efficiency of available technical assistance, the timing of and competence in various surgical and anesthetic techniques, and drug availability.

Extralabel use of many of these agents is an appropriate and common practice in any veterinary medical setting.

Accurate dosing of anesthetic agents

The use of a chart that expresses drug doses as a function of body weight **may** help prevent calculation errors.

- When using a dose chart, caution **should** be used for patient weights at both extremes of the range provided.

Concentrations of drugs used **should** be selected to result in appropriate volumes for patients in the program.

- If commercially available drug concentrations do not accommodate accurate dosing, stock concentrations **should** be diluted as appropriate for individual drugs.

The use of compounded drugs **may** facilitate accurate dosing of patients; however, clinics **must** follow all federal, state, and local laws and regulations related to compounding.

Administration of analgesics and anxiolytics

Analgesic agents are required for all patients undergoing neutering and **should** be administered before the initial surgical incision.

- Acceptable analgesic agents include opioids, α2-adrenoreceptor agonists, NSAIDs, and local anesthetics.
- The use and timing of NSAID administration **should** be based on the specific drug and individual patient.
    - Consideration **should** be given to the patient's hydration status and the presence of preexisting hepatic, renal, or gastrointestinal disease or clotting abnormalities.

    - Administration of NSAIDs to patients who are clinically or subclinically dehydrated **should** be avoided owing to the increased risk of adverse effects.

Total IM anesthesia

Administering a single injection that includes sedative, analgesic, and anesthetic induction agents **may** reduce patient pain and stress, compared with administering multiple injections.

Combining premedications and anesthetic induction agents in a single injection is a useful technique for some spay-neuter programs.

Anticholinergic agents

Anticholinergic agents **may** or may not be routinely administered as part of an anesthetic protocol.

- However, they **should** be available in all spay-neuter clinics for individual patients and emergency use.

Induction and maintenance of anesthesia with inhalant anesthetics

- Although there may be times when mask administration of inhalant anesthetics is required for patients in spay-neuter programs, the use of mask administration **should** be minimized.
- The use of a chamber for administration of inhalant anesthetics **should** be strictly avoided.
- Mask induction **should not** be performed routinely and **should** be avoided.
- The use of mask maintenance on an as-needed basis for some patients is common in some spay-neuter programs. For cats, it **may** be safer than intubation for short procedures.

Mitigating waste anesthetic gas exposure

Anesthetic machines **may** contribute to environmental pollution from waste anesthetic gases.

In addition to performing daily leak tests and using properly functioning scavenging systems, several other measures **should** be routinely employed to limit waste gas release:

- Minimize airway leaks by using appropriately sized endotracheal tubes with proper cuff inflation.
- Eliminate as much residual gas as possible before disconnecting patients from the breathing system after surgery by turning off the vaporizer and allowing patients to breathe oxygen, ideally for 5 minutes, before disconnection.
- Before disconnecting patients, empty the rebreathing bag after the vaporizer is turned off and, if using a circle system, increase the oxygen flow rate to 2 to 3 times the maintenance rate to aid in flushing the system.
- Turn off vaporizers and flow meters when patients are disconnected from the anesthesia machine.

- Use caution when filling vaporizers to ensure that the room is well-ventilated and that as few staff members as possible are present.

High-risk patients

- Attending veterinarians **may** deem patients as being at high risk for anesthetic or surgical complications based on history and physical examination findings.
- Alternative anesthetic protocols **may** be indicated for high-risk patients.
- Anesthetic protocols for high-risk patients might include the use of reversible agents, supplementation with oxygen and fluids, and intubation.
- The veterinarian or a designated member of the care team **should** communicate with the owner, caregiver, or authorized agent of high-risk patients specifically about the patient's anesthetic risk.

Guidelines for Surgical Care

Operating area environment

- The operating area **should** be a room or space in which anesthesia, surgery, and immediate postoperative recovery can be safely performed.
- The necessary equipment for performing anesthesia and patient monitoring **should** be present and readily available.
- Traffic within the operating area **should** be limited to essential personnel.
- Sanitation procedures **should** be carried out on a regular schedule.

Surgical pack preparation

- Separate sterile instruments are required for each patient.
- Instruments **must** be cleaned before sterilization.
- Sterilization of surgical packs **may** be accomplished with steam, gas, or plasma.
- The date and the person responsible for sterilizing packs **should** be identifiable.
- A sterility indicator **should** be located inside and outside the pack.
- The outer wrap material **must** provide a minimum microbial barrier equivalent to dry 270–thread count pima cotton.
    - The wrapping material and pack storage conditions **must** ensure sterility for the longest anticipated pack turnover interval.

Patient preparation

The following issues **should** be considered during patient preparation:

- Bladder:
    - An empty urinary bladder simplifies an abdominal surgical procedure and increases postoperative comfort for both male and female patients.

- Skin:
    - Preparation of the skin **should** be performed in a manner that preserves skin integrity.
    - The prepared area **should** be large enough to prevent inadvertent contamination of the sterile surgical field.
    - After hair removal, the entire skin area **should** be prepared with an appropriate surgical scrub agent used according to accepted patient preparation practice.
- Patient positioning:
    - Ties, V-trays, adjustable tables, or other devices **may** be used to position patients for surgery. The patient's body **may** be maintained in a level or tilted position with the head and neck in straight alignment.
    - Care **should** be taken to position the patient in a manner that avoids compression of the thorax or compromise of the diaphragm.
    - The patient's limbs **may** be secured in place or left unconstrained at the discretion of the surgeon.
    - Hyperextension of the limbs **should** be avoided because it could limit the excursion of the chest, compromising respiration, or resulting in increased tension.
- Patient draping:
    - The surgical drape **should** be of adequate size to prevent contamination of the sterile field.
    - Drape material **must** resist penetration by fluids and microorganisms under normal operating conditions.

Surgeon preparation

The following issues **should** be considered concerning surgeon preparation.

- The surgeon **should** wear appropriate surgical attire intended for use within the operating area.
- Surgical caps and masks are required, except during routine castration of cats and puppies.
- Surgeons **should** perform appropriate hand and arm antisepsis before gloving for all abdominal surgeries and castration of adult dogs.
- The use of sterile surgical gowns, either cloth or disposable, is left to the discretion of the surgeon provided that aseptic technique is maintained.
- Single-use sterile surgical gloves are required for all abdominal surgeries and castration of adult dogs.

For routine castration of cats and puppies, surgeons **should** wash their hands or perform hand antisepsis before gloving.

For routine cat and puppy castration, either single-use sterile gloves or examination gloves are acceptable.

Surgical procedures

- Veterinarians or veterinary students under the direct supervision of a veterinarian **must** perform all surgical procedures.
- General principles of gentle tissue handling, meticulous hemostasis, and aseptic technique **should** be applied.
- To reduce postoperative morbidity and improve overall outcomes, surgeons **should** strive to reduce surgical trauma in every way possible.

Suture materials

Sutures or surgical clips **must** be of

- Biomedical grade
- Approved for medical use
- Sterile
- Dated for current use

Materials **must** be absorbable or inert and nonabsorbable.

Suture materials supplied in individual packets or on a reel or cassette are acceptable and **should** be used according to manufacturers' guidelines.

Suture material **must** not be shared among patients.

Suture material besides stainless steel cannot be effectively resterilized for future use.

- If reusable needles are used, they **must** be cleaned and sterilized between patients.

Identification of neutered animals

Each spay-neuter program **should** choose a consistent, permanent means of visually identifying animals that have been neutered.

The application of a visible, standard, distinct identifying mark is **recommended**.

- For female animals, the tattoo **should** be applied directly on or immediately lateral to the ventral midline incision.
    - If a flank approach is used to spay a female patient, the tattoo **should** be placed in the area where a ventral midline spay incision would have been placed.
- For male dogs, the tattoo **should** be applied to the skin in the caudal aspect of the abdomen.
    - If a prescrotal incision is used, the tattoo **may** be applied directly to the incision.
- For community cats, unilateral ear tipping is the **recommended** method for identifying neutered cats.
    - To ensure a distinct and readily visible identifying mark, approximately a third of the distal earflap **should** be removed.

Spay-neuter programs **may** elect to use > 1 method of identifying individual neutered animals.

Guidelines for Postoperative Care

Recovery

- Patients **should** be assessed after the surgical procedure to determine whether any conditions need to be immediately addressed or communicated to recovery personnel.
- The recovery environment **should** minimize the risk of complications and staff injury.
- Designated recovery areas **should** allow for continuous, direct observation of each patient.
- Patient recovery **should** occur on a secure, level surface, such as the floor or bottom of a cage.
- Animals on elevated surfaces **must** be protected from falls.
- All areas **should** be clean, dry, and warm.
- Loud noises **should** be minimized.
- During recovery, animals **should** be positioned to prevent inadvertent airway restriction.
- Community cats **should** be returned to their traps or transport carriers while unconscious for recovery monitoring.
    - Cats **should** be carefully monitored to ensure that movement or turning in the confined space during recovery does not compromise the airway.

Postoperative complications

Recovering patients **should** be continuously observed for complications related to anesthesia or surgery that may occur in the postoperative period.

Treatment of affected patients **may** include selective drug reversal and supportive care. The following parameters **should** be considered during recovery monitoring:

- Heart rate and pulse quality
- Respiratory rate and character
- Airway patency
- Mucous membrane color
- Signs of pain and anxiety
- Body temperature
- Degree of arousal or sedation
- Movement and ability to ambulate

Identified problems **should** be triaged and addressed accordingly.

Analgesia

Postoperative analgesia requirements will vary among individual patients owing to differences in surgical complexity, surgical technique, patient age, and individual responses to pain and analgesic agents.

- If NSAIDs were not administered before or during surgery, they **may** be administered postoperatively, alone, or in combination with additional opioids or other analgesic agents.
- There **should** be a plan to address analgesia after patients are discharged.
- Options **may** include dispensing medication, providing a written prescription, or furnishing contact information for assistance in acquiring additional analgesic medication.
- Clinicians **must** be prepared to adjust protocols to meet the needs of individual patients following surgery.

Anesthetic Reversal

Potential benefits of anesthetic reversal **may** include reducing or alleviating cardiorespiratory depression associated with anesthetic agents, hastening recovery, and promoting the return of thermoregulation.

- Reversal of sedative, anesthetic, or analgesic agents **may** be performed when patients experience prolonged recoveries or in emergencies.
- Rapid IV administration of reversal agents **should** be avoided except in emergencies.

Return to patient housing

Following initial recovery, patients **should** be periodically evaluated for changes in mental status and overall condition that could signal potential complications, stress, or pain.

- Cleanliness **should** be carefully monitored.
- Pediatric, geriatric, frail, and at-risk patients **should** be protected from hypoglycemia and dehydration by offering small amounts of food and water as soon as appropriate.
- Cats **should** be provided with an absorbent substrate, such as paper, litter, or bedding for overnight stays.
- Traps housing community cats **should** be covered to decrease patient stress and **should** be elevated to allow urine and feces to fall through the wire bottoms away from the patient or lined with absorbent material.

Dogs **should** be

- Walked
- Housed in enclosures that allow elimination away from resting area (*e.g.* runs)
- or provided with an absorbent substrate in their enclosures.

Discharge of patients

- Patients **must** be evaluated immediately before release.
- Postoperative evaluations **should** include assessments for normal mentation and respiration and adequate analgesia.
- Surgical incisions **should** be examined to ensure that the skin edges are clean, dry, and well-apposed.
- Before discharge, cats and dogs **should** be
    - Sternal
    - Alert
    - Responsive
    - Dogs **should** be able to ambulate
- Trapped cats **should** be returned to their familiar environment or site of capture when they are no longer under anesthesia.

Postoperative care instructions

Clients **should** be provided with clear instructions for postoperative care.

- Both written and verbal instructions **should** be provided when possible.

Instructions **may** vary from one program to the next, topics to consider include the following items:

- Summary of procedures performed
- Normal and abnormal recovery behavior
- Signs of discomfort or pain
- Care and monitoring of the surgical incision
- When to offer food and water
- Exercise restrictions, if any
- Medication instructions, if any
- Other special instructions as indicated based on the needs of the individual patient
- Instructions for notification of postoperative complications including contact information for questions or concerns
- Changes in status requiring urgent veterinary reevaluation
- Instructions for emergency care
- Recommendations for ongoing veterinary care

Guidelines for Operations Management

Process-oriented management of surgery

By defining and incorporating standard procedures in each step of the process, HQHVSN programs can improve the quality of care, reduce patient and staff risk, optimize patient outcomes, and improve time and cost efficiency.

Use of standard operating procedures and checklists

Standard operating procedures are **recommended** to ensure consistent care and to manage workflow as patients progress through the surgery process.

- Standard operating procedures **should** reflect current practice guidelines and be flexible enough to meet the unique needs of individual patients.

The use of computerized records **may** further improve patient care and safety by facilitating analysis of trends in patient outcomes.

Data collection and analysis

Morbidity and mortality data, including both perianesthetic and postoperative complications and deaths, **should** be captured.

Recognizing patterns is crucial to reducing morbidity and mortality rates because pattern detection alerts the healthcare team to areas where the likelihood of complications is greatest so that protocols can be improved and vigilance increased at critical points.

Staff training

Adequate training as well as ongoing skill and knowledge development is necessary for all program personnel to ensure proper animal care and safety as well as staff safety.

- Training **may** consist of written materials, videos, demonstrations, drills, shadowing current personnel, and supervised performance of job duties.
- Before unsupervised performance of work duties, knowledge and proficiency in the required task **should** be demonstrated.
- All staff members **should** participate in relevant continuing education and satisfy any state-mandated continuing education requirements.

Leadership

Leadership that values and empowers followers has been shown to increase program performance and employee satisfaction and well-being and decrease employee turnover.

- Leadership training is an effective intervention that **should** be considered for anyone entering a leadership position.

Personnel health and safety

High-quality, high-volume spay-neuter programs **should** foster a safe and healthy work environment for program personnel.

Spay-neuter programs **should** take the necessary precautions to ensure

- Chemical and biological safety
- Management of waste anesthetic gas exposure

- Safe disposal of sharp instruments
- Minimize the risk of occupational noise exposure, zoonotic disease transmission, physical injuries, compassion fatigue, and other work-related health problems

Workplaces **should** also strive to create a safe, supportive environment in which mental health issues are not stigmatized.

- Workers **may** be trained to recognize early signs of stress, compassion fatigue, and depression in themselves and others, and programs **should** provide a supportive atmosphere and referral to mental health services.

Perioperative ergonomics

Optimizing perioperative ergonomics in HQHVSN programs is crucial for occupational health and safety and warrants special consideration because of the impact on surgeon health, productivity, and long-term sustainability.

Regulatory and legal considerations

These guidelines are meant to supplement, not replace, applicable laws and regulations.

Consulting both an attorney and an accountant are **recommended** to help ensure compliance with all applicable laws and regulations.