



TRENDS IN VETERINARY NURSING

Considerations for Creating a Small Animal Blood Bank

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The growing demand for canine and feline blood products, coupled with ongoing supply shortages, has left many veterinary clinics across the United States considering the possibility of starting their own blood banks. Globally, the industry is exploring innovative strategies to increase blood product availability for small animals, such as mobile blood donation centers in Asia¹ and leveraging small animal shelter populations in Italy.²



Limited research has been conducted regarding public awareness of pet blood banks. One study surveyed veterinary clients to assess their awareness of small animal blood banks. The findings supported the authors' hypothesis that many pet owners are unfamiliar with animal blood banks and that limited education and awareness were the major barriers preventing pet owners from considering blood donation for their pets.³

This article will review some of the top considerations for veterinary clinics looking to start their own blood bank to help meet the growing demand for small animal blood products.

CHECK STATE AND LOCAL REGULATIONS

State-level regulatory boards and veterinary medical boards are the main governing bodies for animal blood banks in the United States. There are currently no

licensing requirements for veterinary blood banks in 49 states. California, the exception, has established a state-specific governing body, the California Department of Food and Agriculture Animal Blood Banks Program. Regardless of where one lives, it is important to check city and state regulations before establishing a blood bank to ensure compliance. It is also important to note that the U.S. FDA Center for Veterinary Medicine does have a low profile for animal blood banks and has the right to visit and inspect all animal blood banks.

CREATE PROCESSES AND PROCEDURES

When creating a blood bank, it is essential to maintain meticulous records, adhering to ethical and best practice standards established by the Association of Veterinary Hematology and Transfusion Medicine (AVHTM), the American College of Veterinary Internal Medicine (ACVIM), and the AVMA.

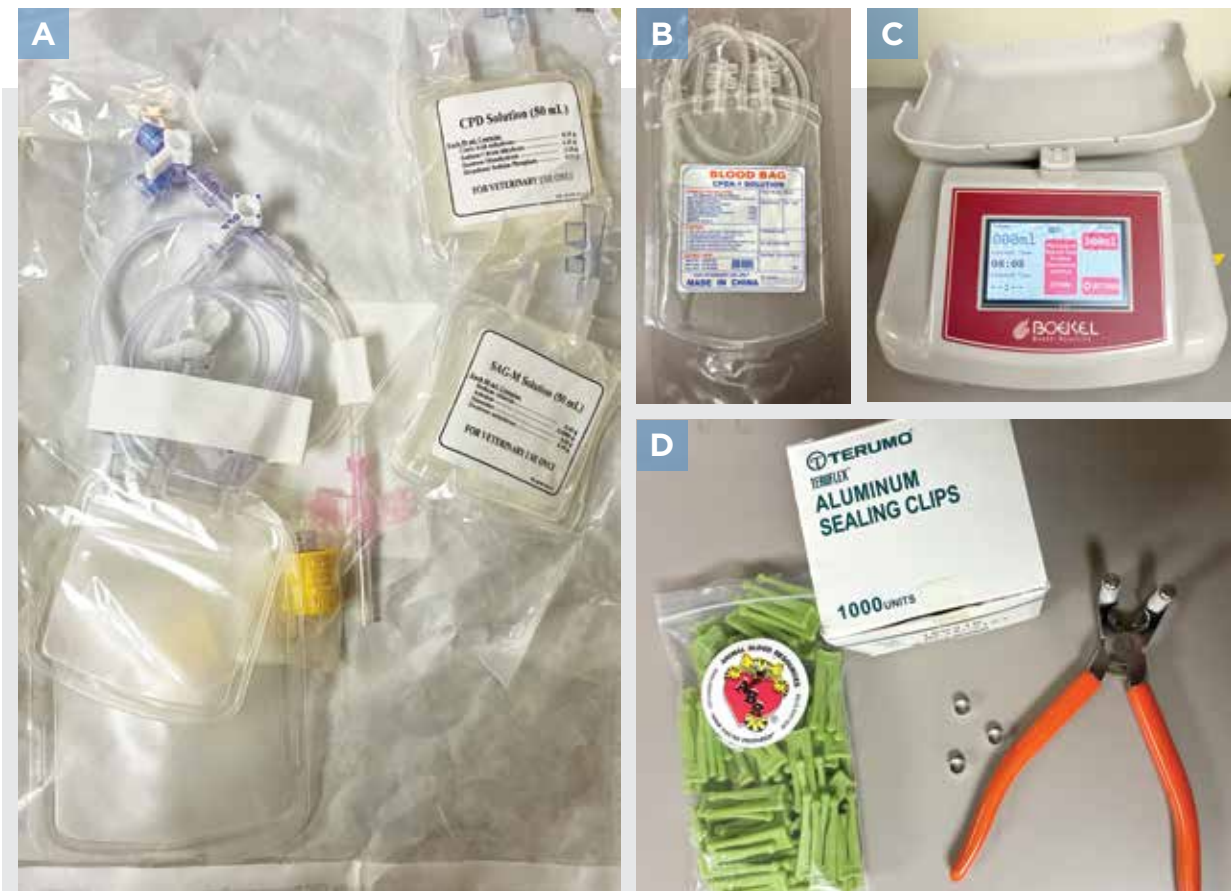


FIGURE 1. Essential supplies for whole blood collection: (A) feline collection system; (B) canine whole blood collection system; (C) rocking blood scale; and (D) strippers, clips, and clamps.



Despite the widespread use of veterinary blood products and publications on donor selection, blood collection and product administration are at times based on surveys completed by veterinary professionals.⁴ Several groups within veterinary medicine, such as the AVHTM, ACVIM, and Veterinary Emergency and Critical Care Society, are working to expand data collection and create guidelines. As with many advances in veterinary medicine, guidance is often drawn from human medicine. Resources from the Association for the Advancement of Blood and Biotherapies help shape veterinary blood banks. Standard operating procedures (SOPs) should be created using resources from these groups before collections begin, and all staff should be trained to follow them meticulously. SOPs should encompass donor screening, collection, blood handling, component processing (if applicable), record keeping, storage, usage, and redistribution packaging (if applicable).

Even when products are collected on an as-needed basis and administered directly to another patient, detailed records must be maintained. This may include documentation of testing performed on the donor in accordance with the blood bank's SOP, donor vitals (both pre- and postcollection), the volume collected, the vein utilized, the overall donation process, donor recovery postdonation, and storage of an aliquot from each unit for 1 year in the event that a unit needs to be tested for suspected contamination.

START WITH WHOLE BLOOD COLLECTION

One of the more manageable routes of blood collection for an in-house voluntary-based blood bank is collection and administration of whole blood. Starting

with whole blood products eliminates the need for expensive equipment used to process whole blood into its components. This start-up method also allows time to build a donor pool and obtain training and further experience with blood collection while still allowing the administration of lifesaving blood.

The main blood bank supplies that are necessary to collect whole blood include collection bags with anticoagulant, a blood scale, atraumatic clamps, tube strippers, and a tube sealer or aluminum clamps (**FIGURE 1**). The collection and storage of whole blood also require a medical-grade blood refrigerator that has temperature-monitoring capabilities and an alarm system that alerts users to any temperatures reached outside of a set parameter.⁵

PROCESSING WHOLE BLOOD

The next step in expanding a blood bank would be the processing of a whole blood unit into basic components of packed red blood cells and fresh frozen plasma.

SOPs should be created for processing, storage, and shipping of units before component therapy is started. This would require a dedicated space, the purchase of additional equipment, and additional training for clinical staff.

The additional equipment needed for component processing includes component-specific collection bags, a refrigerated centrifuge, buckets for centrifuges, a plasma press, a medical-grade blood refrigerator, and a medical-grade plasma freezer (**FIGURE 2**). It is ideal to have the refrigerator and freezer attached to a source that is backed up by a generator in the event of a power outage to avoid catastrophic loss of blood products. Additionally, meticulous records of the temperature maintained in these units can help ensure the safety of the product. Temperatures on these units should be recorded daily. Manual recording introduces risk of human error; to avoid this, it is best to utilize devices that can be placed inside the units that alert users to any changes in temperature to ensure consistent temperature monitoring. The cost of each of these necessary products can vary greatly depending on size, brand, and condition (e.g., new, used, refurbished).

As a blood bank continues to expand, additional equipment that may aid in time management and streamlined collection can include a rocking scale, a HemoCue, and a dielectric tube sealing device. Further

It is ideal to have the refrigerator and freezer attached to a source that is backed up by a generator in the event of a power outage to avoid catastrophic loss of blood products.





expansion of a blood bank, which may be out of the scope of most clinics, could include processing of additional components such as cryoprecipitate, platelet products, and leukoreduced products. Blood banks that have an extensively trained technical team and specialized equipment may also have the ability to produce lyophilized products.

SECURING BLOOD DONORS

Once state and local regulations have been reviewed, SOPs are established, all necessary equipment is obtained, and staff members are fully trained, the next step is securing healthy donors.

Donor Recruitment

When screening donors, the safety of both donor and recipient must be prioritized. Although donors must satisfy specific eligibility criteria, careful attention to their overall wellbeing is imperative. This process should be designed to minimize stress and risk, ensuring the safety and comfort of each pet. Potential donors that have temperament issues, medical concerns, or those that fail the physical exam or prescreening bloodwork should not be considered (see **DONOR CRITERIA** section).

Additionally, owners must understand and be prepared for the responsibilities involved, including time commitment (availability to come in for a donation



FIGURE 2. Essential supplies for blood component processing: (A) medical-grade blood refrigerator, (B) canine component processing bags, (C) plasma press, (D) plasma freezer, and (E) table top centrifuge.



every 8 to 12 weeks), reliability (to show up to appointments and maintain a clear line of communication with the veterinary team), ensuring consistent use of preventives, and communicating if the donor falls ill or has traveled outside of the local area.⁶ While the risks of complications during or after donation are low, owners should be made aware of the potential risks that come with donation, which can range in severity from reaction to the antiseptic used to prepare the donation site to potential hypovolemic episodes up to 24 hours after donation. Clear discussion of these expectations is essential while ensuring the owners are aware that voluntary donors can be withdrawn from the program at any point in time. When recruiting canine and feline donors, it is important to understand that a portion of the applicants in volunteer-based programs may not advance to the donation phase.⁷

Donor Criteria

Qualifications vary slightly between canine and feline donors; however, general criteria are similar, including age, vaccination status, consistent use of preventives, friendly disposition, medical history, and transfusion history. Creating and utilizing a medical history questionnaire can aid in providing a full picture of the donor's history. Most blood banks require donors to:

- Be between 1 and 8 years of age
- Remain up to date on all core vaccines
- Not have received a blood transfusion in the past
- Receive year-round flea, tick, and heartworm preventives
- Be indoor-only if a cat, as outdoor exposure increases the risk of disease or illness for feline donors

It is important that donors be at a healthy and appropriate weight, as blood collection volumes are based on lean body weight, typically 11 to 19 mL/kg for dogs and 10 to 12 mL/kg for cats. The common weight minimum for feline donors is 10 lb (4.5 kg). For canine donors, the weight minimum varies based on the size unit that is being collected. Most canine donors weigh at least 50 lb (22.7 kg), allowing them to donate a standard 450-mL unit; canine donors between 40 and 49 lb (18.1 to 22.2 kg) are able to donate a 250- to 300-mL unit.^{6,8} Adherence to weight restrictions, collection volume guidelines, and recommended donation frequency of every 8 to 12 weeks is essential to ensure the safety of the donor. Some research studies suggest donation up to every 4 to 6 weeks; however, the literature is lacking in regards to

guidance on the exact interval timing for safe donation, especially in relation to iron levels.⁹ Additionally, donating frequencies of 4 to 6 times per year can help avoid donor and owner fatigue and burnout.⁶

Additional considerations include diet (e.g., raw diet), reproductive status (i.e., intact or neutered), preexisting medical conditions, and intermittent or chronic medications. As there is no current consensus statement, decisions to exclude a donor based on these additional considerations remain at the discretion of the hospital and supervising veterinarian.

Screening Requirements

Once a donor has met all eligibility criteria and no concerns are noted on the physical exam, the next step is to perform a blood analysis for screening.

Veterinary blood banks across the United States rely on consensus statements from organizations such as the ACVIM to guide screening of canine and feline donors for blood-borne pathogens. To minimize the risk of pathogen transmission, all blood donors should undergo appropriate infectious disease testing.¹⁰ The consensus statement provides recommendations for both minimal and optimal testing standards for canine and feline pathogens, including vector-borne and non-vector-borne diseases. Minimum testing for vector-borne pathogens should include *Anaplasma*, *Babesia*, *Bartonella*, *Ehrlichia*, *Leishmania*, *Mycoplasma*, and *Dirofilaria immitis*.¹⁰ Minimum testing for non-vector-borne pathogens should include *Lentivirus* (feline immunodeficiency virus) and *Gammaretrovirus* (feline leukemia virus) for feline donors.¹⁰ Additional recommendations address gold standard testing, including testing based on breeding status as well as for diseases endemic to specific regions. Donors should be screened at least annually due to the potential risk of pathogen transmission to recipients.

In addition to infectious disease testing, donors should undergo annual comprehensive blood analysis, including a CBC and serum biochemical profile. Blood typing is performed only during initial screening, while additional testing such as thyroid panels, fecal exams, and urinalysis may be conducted based on blood bank protocols. Canine donors should be typed for at least dog erythrocyte antigen (DEA) 1. Due to the lack of evidence that they are clinically significant, blood banks may not type for DEA 4, 5, or 7. It is worth considering testing for the Dal antigen in canine breeds



that have been shown to have a higher prevalence of lacking this antigen (e.g., Dalmatians, Doberman pinschers).^{11,12} Further screening may also be warranted for breeds predisposed to genetic disorders (e.g., von Willebrand disease in Doberman pinschers).

SCHEDULING A DONATION APPOINTMENT

After these evaluations are completed and a donor is deemed healthy and eligible, they may proceed to blood donation scheduling. Prior to any donation, the staff member scheduling the appointments should:

- Confirm that the prospective donor is up to date on vaccines and preventives
- Review medications (and determine if any being taken are acceptable per the blood bank's guidelines)
- Assess any changes in medical, surgical, or travel history

This must also be checked the day of the donation. A comprehensive questionnaire completed by the owner prior to each donation can serve as a valuable tool to ensure all relevant health and lifestyle updates are captured. If a donor is sick, is receiving medications, or needs a medical procedure themselves, these factors may disqualify them from donating temporarily or permanently depending on the circumstances.

SUMMARY

As the need for safe and reliable blood products for small animals continues to expand, veterinary clinics and hospitals can consider creating their own blood bank. In doing so, they must remain diligent in their protocols, embrace evolving best practices, and foster transparent communication with pet owners. By prioritizing donor health, adhering to consensus guidelines, and implementing robust operational procedures, the field can continue to advance, providing lifesaving transfusion therapies and supporting the wellbeing of companion animals. The ongoing collaboration between veterinary professionals, regulatory bodies, and pet owners will be essential in shaping the future of animal blood banking and ensuring the highest standards for patient care. **TVN**

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Lexi started her career in the veterinary industry at Morrisville State College, where she received her bachelor's degree in equine sports medicine and rehabilitation. She then went on to attend SUNY Delhi to obtain her associate degree in veterinary technology. After becoming an LVT in New York in 2016, she moved to North Carolina and became licensed as an RVT while pursuing her dream of working in emergency medicine. She was able to obtain her VTS (ECC) credential in 2021. She currently works at BluePearl as a technician and assistant trainer as well as managing the blood banking program. When she is not busy at work, she is spending time with chickens; volunteering with DEGA, a nonprofit veterinary group; baking; or gardening.