The University of Pennsylvania Institutional Animal Care and Use Committee (IACUC) has developed the following guideline to help research investigators understand the best practices for blood collection to minimize pain and distress for the animals and also to provide guidance on common sites of blood collection in a variety of species. Blood collection, or venipuncture, is a common procedure performed in animal research studies which requires IACUC review, training, and veterinary guidance as mandated by the Animal Welfare Regulations (AWR) and the Public Health Service Policy (PHS).

IACUC AND TRAINING REQUIREMENTS

AWR 2.31 (c) (6)  
“With respect to activities involving animals, the IACUC, as an agent of the research facility, shall review...those components of proposed activities related to the care and use of animals...”.

Blood collection must be described in your animal care and use protocol. The description should include all potential collection sites/methods, the amount(s) to be withdrawn and the type of restraint needed. If the protocol involves more than one species this must be described for each species.

AWR 2.33 (b) (4)  
“Each research facility shall establish and maintain programs of adequate veterinary care that include guidance to principal investigators and other personnel involved in the care and use of animals...”

Consult with a ULAR veterinarian for additional guidance when writing your protocol. Certain species may have unique limitations to site of venipuncture, necessary restraint, or volume of blood that can be safely collected.

PHS Policy IV.C.1.f.  
“...the IACUC shall determine that the research project conforms with the institution’s Assurance and meets the following requirements: (f) Personnel conducting procedures on the species being maintained or studied will be appropriately qualified and trained in those procedures.”

Species-specific training, which includes routine blood collection, is required prior to protocol review. To complete this training, please see the Training Requirements section on the IACUC website. If you would like additional training in bleeding procedures, please contact the ULAR Training Division.

Certain techniques, e.g. submandibular bleeding, may require proof of proficiency in before individuals are approved to perform these techniques unsupervised.

If you need to contact a ULAR veterinarian or the ULAR Training Division, please visit www.ular.upenn.edu
Guideline 1
BLOOD COLLECTION

GUIDANCE

1. **Total Blood Volume**: approximately 6-8% of the animal’s total body weight. For example: a 30 gram mouse has a circulating blood volume of approximately 1.8 milliliters.

2. **Maximum Volume Collected**: 1% of the body weight (~10% total blood volume, 10 ml/kg) in any three-week period.
   - 0.3 ml can be collected from a 30 gm mouse
   - 100 ml (0.1L) can be collected from a 10 kg dog

3. If more than 5 ml/kg of blood is collected at one time, it is mandatory that fluid therapy be performed. The volume of replacement fluids should be equal to the volume of blood collected or 0.5 ml, whichever is greater. Fluids may be given subcutaneously (SQ) or intravenously (IV). It is recommended that volumes be verified with ULAR veterinary staff. Exceptions may be considered if scientifically justified.

4. After venipuncture, an animal cannot be returned to its cage until it has achieved complete hemostasis. Depending on the procedure, this may be done by using direct pressure applied to the site, sutures, cauterization, styptic powder, silver nitrate sticks or other methods. Manual pressure may need to be applied for several minutes in order to achieve complete hemostasis. Please consult with a ULAR veterinarian for the best option. Additionally, if bleeding cannot be stopped contact the ULAR veterinary technicians for assistance.

5. Some protocols may require the use of blood for transfusions or other study related procedures. Blood and/or blood products can be purchased from companies and stored for later use. Please consult with a ULAR veterinarian regarding the purchase of these products. Possible vendor options include:
   - Hemostat Laboratories – [http://www.hemostat.com/]#

6. If you require blood donors on your protocol please be aware of the following items and always consult with a ULAR veterinarian when designing your protocol and/or amendment.
   - You must provide justification as to why you need a blood donor and why you cannot obtain blood/blood products from another source.
   - The protocol should specify if the animal is being used solely as a donor or if it may be used in other procedures described in the protocol.
Guideline 1
BLOOD COLLECTION

- The animals should be screened prior to use to ensure they are clinically normal, not harboring diseases and, if applicable, are compatible with the recipient(s) (e.g. cross matching).
- Blood donors should be given a “rest period” between samplings and/or other procedures to allow for recovery from significant blood draws. They should also be treated with subcutaneous fluids.
- The protocol should clearly state who will be performing the blood draws, how and where the blood will be stored, and when the donor blood is expected to be used.

Attachments
Attachment 1 – Common Sites for Blood Collection