



4.4.

- 5.6. Intramuscular injections:
  - 5.6.1. Due to their small muscle mass, intramuscular injections should be avoided in smaller species as it is technically difficult and painful for the animals.
  - 5.6.2. Check proper placement of the needle prior to injection by withdrawing the syringe plunger; if blood enters the needle hub, the needle has entered a blood vessel. Withdraw the needle slightly and redirect it.
  - ~~5.6.3.~~ Intramuscular administration should be limited to 2 sites per day.
  - 5.6.4. Injection sites should be rotated.
- ~~5.7.~~ Intraperitoneal injections:
  - 5.7.1. This technique is not recommended in late-term gestating animals.
  - 5.7.2. Become familiar with the internal anatomy of the species used to avoid penetration of internal organs during injection.
  - 5.7.3. Check proper placement of the needle prior to injection by withdrawing the syringe plunger; if blood, urine, or digesta enters the needle hub, withdraw the needle and discard solution.
  - 5.7.4. Limit intraperitoneal injections to twice per day.
  - 5.7.5. Injection sites should be rotated.
    - Osmotic minipumps can be surgically implanted intraperitoneally when repeated dosing is required.
  - 5.7.7. In birds, the intracoelomic route is used.
- ~~5.8.~~ Subcutaneous injections:
  - 5.8.1. Subcutaneous administration should be limited to 3 sites per day.
  - 5.8.2. Check proper placement of the needle prior to injection by withdrawing the syringe plunger; if blood enters the needle hub, the needle has entered a blood vessel. Withdraw the needle slightly and redirect it.
  - 5.8.3. Osmotic minipumps can be surgically implanted subcutaneously when repeated dosing is required.
- 5.9. Intravenous injections:
  - 5.9.1. Limit the number of punctures to 5 per site, per day.
  - 5.9.2. Rotate injection sites, if possible.
  - 5.9.3. For continuous infusion, cannulas or catheters may be fixed or surgically implanted.
- 5.10. Intranasal instillation:





## Recommended needle sizes



**Possible maximum volumes of administration**

