

**GENERAL GUIDELINES FOR MEDICATIONS**  
*Recommendations by Dr. Pam Walker*

**CRIAS**

***Birth***

- Rota/Corona virus vaccine (Calf-guard by Pfizer): 3 cc, orally, soon after birth (optional)
- E. coli oral vaccination (Bar-guard by Boehringer Ingelheim): 5 cc, orally, 3 - 5 hours after birth

***2 days of age***

- Clostridium perfringens type CD & Tetanus vaccine (CD & T vaccine): 2 cc, Sub Q (if cria very small < 10 lbs, give 1 cc)

***7 days of age***

- Bo-Se (Vitamin E & Selenium 1 mg/cc): 1 cc/40 lbs, Sub Q
- Vitamin A & D: 1,000 IU/lb, Sub Q (calculate dose based on Vit D concentration, toxic if overdosed)

***30 days of age***

- CD & T vaccine: 3 cc, Sub Q (for the rest of the boosters)

***60 days of age***

- CD & T vaccine: 3 cc, Sub Q

***6 Months***

- CD & T vaccine: 3 cc, Sub Q
- Vitamin A & D: 1,000 IU/lb, Sub Q

**WEANLINGS**

(for most crias, wean at 6 months, minimum 60 lbs, can do a little earlier if dam is thin)

- Bo-Se (Vitamin E & Selenium 1 mg/cc): 1 cc/40 lbs, Sub Q
- Check fecal, if parasites present give either Fenbendazole 10 cc, orally for 3 days OR Valbazen 3 cc/60 lbs, orally, once

**MENINGEAL WORM PREVENTION**

(may vary depending on climate). Can start at 3 to 4 months of age. Safe to use in pregnant females, avoid the first 45 days if possible.

- Ivermectin 1.5 cc/100 lbs, Sub Q every 30 to 45 days OR
- Dectomax 2.0 cc/100 lbs, Sub Q every 45 to 60 days

***Twice a Year:***

General de-worming (this should be done based on fecal analysis and Body Condition Score, refer to article in Fall 2008 Suri Network journal, recommendations may change depending on which and how many parasites are present in the animal)

- Fenbendazole (wide margin of safety – hard to overdose)
  - Females: 20 cc, orally, daily for 3 to 5 days – Safe to use in pregnant females
  - Males: 20 cc, orally, daily for 3 to 5 days
  - Young crias: 3 – 5 cc, orally, daily for 3 to 5 days
  - Weanlings: 7 – 10 cc, orally, daily for 3 to 5 days
  - Yearlings: 10 – 15 cc, orally, daily for 3 to 5 days
- Valbazen (narrow margin of safety, dose based on weight only, not to be used in crias < 6 months)
  - Open Females ONLY: 5.0 cc/100 lbs, orally, Once, can repeat in 7 days if needed
  - Males: 5.0 cc/100 lbs, orally, Once, can repeat in 7 days if needed
  - Weanlings: 3 cc/60 lbs, orally, Once

***Yearly:***

**CD & T vaccine: 3 cc, Sub Q**

- Females: can do 30 days before due date, or 2 days after gives birth (preferred option)
- Males: can do based on age of male, OR choose same time each year to give all males a booster
- Maidens: give booster before they get bred the first time.

*These are very general recommendations. Individual farm needs may vary depending on location, number of animals on the farm and unforeseen factors. Please consult Dr. Walker or your local veterinarian if you have any questions or concerns at [pam@alpacajack.com](mailto:pam@alpacajack.com) or 1.888.872.5722.*

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## MEDICATIONS FOR CAMELIDS

The alpaca population is continuing to grow in the United States with an increasing need for scientific information about proper dosage for medications in camelids. There is ongoing research in many institutions to try to find answers for these questions. The lack of complete information represents a challenge for veterinarians and camelid owners when determining a course of treatment for their camelid patients. As alpaca owners it is important to work with your local veterinarian to plan treatment protocols for your alpacas. There are many factors to take into consideration when determining which drugs and what dosage to use in different situations. The information provided here is a basic guideline; specific treatments should be started only with the guidance of your veterinarian.

Due to lack of complete information, the dosages used in camelids are frequently taken from dosages used in cattle and horses. However, several differences have already been discovered; for example, antibiotics, as a general rule, appears to have a longer time of action in camelids compared to domestic ruminants. There also seems to be a difference in dosing between llamas and alpacas. These differences can be dangerous and result in fatal over-dosages if the drug mechanism is not understood, for example Panacur and Valbazen doses. The choice of which drug to use in certain situations is a complicated decision and should not be decided upon in a "cookie cutter" manner. The age, sex, pregnancy status and general health of the alpaca should be taken into consideration when deciding which drug to use. The following information is on drugs commonly used in alpacas.

### Abbreviations:

PO – orally, SC – subcutaneous, IM – intramuscular, IV – intravenous  
SID – once a day, BID – twice a day, TID – three times a day, QID – four times a day  
EOD – every other day, ETD – every third day, IU – international unit

### How to calculate how many mL (same as cc) to administer:

Animal's weight: 100 lbs  
Drug concentration: 50 mg/mL  
Dose of drug: 2 mg/lb

$100 \text{ lbs} \times 2 \text{ mg/lb} = 200 \text{ mg of drug needed}$

$200 \text{ mg} \div 50 \text{ mg/mL} = 4 \text{ mL of drug to administer}$

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## Antibiotics

**A. Sulfa drugs** – The **ONLY** use for Sulfa drugs in camelids is for the treatment of intestinal coccidia. The use of Sulfa drugs must be used with caution as a potentially fatal complication called Polioencephalomalacia can occur. Polioencephalomalacia is a condition where there is a sudden lack of Vitamin B1 in the first compartment and causes subsequent softening of the brain. This results in neurologic signs – most notably blindness. Normally this condition can be treated by administering Thiamine (Vitamin B1), but when the condition is caused by Sulfa drugs, it is non-thiamine responsive and is usually fatal.

1. **Albon (Sulfadimethoxine)** – comes in different concentrations, this will determine the amount to be given. See above calculation for example.

**Dose: Day 1: 25 mg/lb, PO, SID Day 2-5: 13 mg/lb, PO, SID**

2. **SMZ, TMS, TMP (Trimethoprim-sulfamethoxazole)** – is **NOT** effective orally in adults and ruminating crias (> 30-45 days), this has been proven conclusively by two scientific studies.

**Dose: 8 mg/lb, PO, BID (Dose base on the Sulfamethoxazole portion)**

**B. Penicillins** – In general considered to be a very safe class of drugs that can be used at very high dosages if needed.

1. **Procaine Penicillin G (300,000 IU/mL)** – the **only** concentration available (do not use the Benzathine form). Commonly used to treat skin infections/wounds, infected foot pads, umbilical infections and follow up treatment for Listeriosis (bacterial infection in the brain). Best choice to use if suspect Clostridium infection. Not a good choice for Upper Respiratory Infection or Pneumonia. Anaphylactic shock (respiratory failure and collapse) can occur on occasion and must be treated immediately with Epinephrine (1 mL/100 lbs, IM) to prevent death. If this happens, do not use this drug again in that animal.

**Dose: 10,000 IU/lb, SC, BID (0.8 mL/ 25 lbs, 3.5 mL/100 lbs)**

**OR \*\* Dose: 20,000 IU/lb, SC, SID (1.6 mL/25 lbs, 7 mL/100 lbs)**

2. **Ampicillin** – comes as a SC form (Polyflex) and an IV form (Ampicillin sodium). Considered safe in other species, no studies done in camelids.

**Dose Polyflex: 10 mg/lb, SC, BID**

**Dose Ampicillin sodium: 5 mg/lb, IV, TID to QID for Listeriosis**

3. **Naxcel, Excenel (Ceftiofur)** – commonly used to treat neonatal sepsis, upper respiratory infection, pneumonia, retained placenta and uterine infections. Naxcel can be used IV or SC. If used IV, must be given BID. With severe infections and SC usage, can also use BID. Excenel has the same parent drug as Naxcel, just a different carrier that allows it to be kept at room temperature, with a long expiration date, it should be given SC. Concentration for both is 50 mg/mL.

**Dose: 1 – 2 mg/lb, SC, IV, SID to BID (0.5 – 1.0 mL/25 lbs, 2 – 4 mL/100 lbs)**

4. **Excede (Ceftiofur Crystalline Free Acid)** – a product labeled for respiratory infection in cattle and swine. It is intended to be administered as a one time treatment SC at the base of the ear in cattle and IM at the base of the ear in swine. Due to this unique location of delivery of the drug, and the unique physiology of camelids, absorption may be unpredictable and no research has been done in camelids. Regardless of this Excede has been used by many veterinarians in camelids with apparent success. When administered, it is important to confirm the needle is not in a vein (pull back on plunger to check for blood) as this drug will kill instantly if given IV. Excede is probably best reserved to use in animals that can not be given injections every day. If needed, an additional dose can be repeated on day 4 if your veterinarian has determined it is appropriate.

**Dose: 3 mg/lb, SC, can repeated on Day 4 (1.5 mL/100 lbs)**

**C. Aminoglycosides** – Gentamicin, Amikacin should only be used with extreme caution as they can cause death due to kidney failure if given for prolonged periods (>5 days in a row) by IV, IM or SC route. Kidney function should be monitored closely and the animals should only be given this drug class while supplemented with IV fluids. They can be used as part of an intrauterine lavage without risk of toxicity.

**Gentamicin and Amikacin** – Gentamicin is considered to be more kidney toxic than Amikacin in other species, regardless of which form is used, a maximum 5 day, once daily dosing is the recommended means of administration systemically.

**Dose: 2 – 3 mg/lb, SC, IV, SID, for 5 days ONLY**

**D. Nufloor (Florfenicol)** – commonly used to treat upper respiratory infection, pneumonia, and tooth root infections in camelids.

It is a broad spectrum antibiotic that is labeled to treat respiratory infections in cattle. The advantage of this antibiotic is that it is given every other day (EOD). Once injected under the skin, the drug is absorbed at a constant rate over 48 hours. Based



on current information known, it should not be given every day as this may cause toxicity. Due to how the drug is metabolized (by the liver), it should not be given to young crias (less than 3 months old). Contraindicated to use with any other antibiotics.

**Dose: 9 mg/lb, SC, every 48 hours (1 mL/35 lbs, 3 mL/100 lbs)**

**E. Baytril 100 (Enrofloxacin)** – commonly used to treat neonatal sepsis, upper respiratory infection, pneumonia, and uterine infections in camelids. It is labeled for treatment of respiratory disease in beef cattle. It is considered to be a "big gun" and should not be used as a first choice antibiotic. In puppies (< 8 months), use of this drug is associated with cartilage damage in joints, it is unknown if the same is true for camelid crias. Use of this drug in cats has been associated with blindness with high doses and long term use; the same has been reported in a Guanaco after 26 days of therapy. Research has looked at oral absorption of this drug in camelids using double the injectable dose. There is absorption at 4.5 mg/lb, PO, SID but it is still preferred to give Baytril either SC or IV. It is considered to be a broad spectrum antibiotic, but does not work against *Streptococci*, *Enterococci*, *Actinomyces*, *Pseudomonas* bacteria or anaerobic infections.

**Dose: 2.3 mg/lb, SC, IV, SID to BID (IV route) (0.6 mL/25 lbs, 2.3 mL/100 lbs)**

**F. Biomyacin 200, LA 200 (Oxytetracycline)** – used on the farm mainly for the treatment of *Mycoplasma haemolamae* ("Epe") in camelids. It is a very irritating drug and should not be used IM and SC placement needs to be done carefully, alternating injection sites and thoroughly rubbing flat the drug under the skin. The brand **Biomyacin 200** is much less irritating and is the preferred product. It is labeled for every other day use in cattle, but the researcher at Oregon State University recommends it be given every three days (ETD) for 5 treatments. In some cases of *M. haemolamae* it may take more than 5 treatments if the animal remains anemic. If it used IV, it must be given SID.

**Dose: 9 mg/lb, SC, ETD for 5 treatments (4.5 mL/100 lbs)**

### Anti-inflammatory, Analgesics (pain management)

**A. Banamine (Flunixin meglumine)** – this is a non-steroidal anti-inflammatory drug used to treat pain, inflammation and endotoxemia (toxins in the blood from bacterial infections). It does not have properties to directly cause calmness, except as what would be expected by the relief of pain. If used for long term, it may lead to ulcers in the third compartment. It should also be used with caution in dehydrated camelids as it can damage the kidneys. In dehydrated animals, use one-half dose until the animal is fully hydrated. Depending on the reason it is being used, once a day seems to clinically be adequate. If the animal becomes painful again after 12 hours, an additional dose can be given for short term use. To avoid severe side effects it is best if the animal is fully hydrated (possibly on IV fluids). It is not effective if used orally.

**Dose: 0.23 mg/lb – 0.5 mg/lb, IV, IM, SC, SID to BID (0.5 – 1 mL/100 lbs)**

**B. Etogesic (Etodolac)** – this is an oral non-steroidal anti-inflammatory drug used to treat pain, primarily pain of bone origin. It is a drug used mainly in dogs and no formal research has been done in camelids. I have used it in cases of bone injury after repair and the animal is still painful and having a hard time getting around. It can also be used if there is a non-specific lameness, once it has been determined by X-rays that there is not a repairable injury present. As we do not know if it causes ulcers, I recommend to use it SID for 7 days, then EOD for another 2 to 3 weeks if needed. If the pain seems controlled on EOD, then reduce to two times a week.

**Dose: 4.5 mg/lb, PO, SID for 7 days, then decrease to EOD**

**C. Ketoprofen (Ketofen)** – this is a non-steroidal anti-inflammatory drug used mainly in horses and dogs. Minimal research has been done on camelids and it is used very little clinically. It has a very short duration of action. As there are other, effective anti-inflammatory drugs available, probably not a good choice to use unless your veterinarian has experience with the drug.

**Dose: 0.9 mg/lb, IV, IM, SC**

**D. Phenylbutazone "Bute" (Butazolidin)** – based on research, probably not useful in camelids

### Anti-Ulcer medications

**A. Carafate (Sucralfate)** – a drug that works in an acid environment to bind to ulcerated tissue in the third compartment. Can be given BID to QID. If it is used in combination with Cimetidine, the Carafate must be given 1 to 2 hours BEFORE the Cimetidine.

**Dose: 1 gram/50 lbs, PO, BID to QID**

**B. Cimetidine HCl injection** – blocks the cells that produce acid in the third compartment and makes the pH higher and helps ulcerative tissue heal. Can be given IV or SC. Must be given 1 to 2 hours AFTER Carafate is administered. It has a short duration of action and can be given BID to QID.

**Dose: 4.5 mg/lb, IV, SC (1.5 mL/ 50 lbs)**



**C. Protonix (Pantoprazole)** – a newly researched drug that blocks the cells that produce acid in the third compartment. This makes the pH higher and helps ulcerative tissue heal. Can be given IV or SC and the action of the drug will last for 24 hours. Unknown how it will interact with Carafate. It comes in 40 mg vials that must be rehydrated before use. This drug is just starting to be used clinically in limited situations as it is a very expensive drug.

**Dose: 1 mg/lb, IV, SC every 24 hours**

**D. Gastroguard (Omeprazole)** – **DOES NOT WORK** in camelids that are old enough to chew their cuds!! For young crias, can use 1 to 2 clicks, twice a day.

### De-worming drugs

**A. Avermectins** – not effective on Nematodirus, Whipworms, Capillaria and Tapeworms. May still work on some farms with simple Strongyle type infections. Best when used to prevent Meningeal worm infection. Should always be given SC, not effective as Meningeal worm prevention if given orally. Limited effectiveness with Chorioptic mange infection as the mite lives on the surface of the skin and does not take in much blood when eating. These drugs can be started in crias that are actively grazing (2 to 4 months) as prevention of Meningeal worm infection.

1. **Ivermectin** – shorter duration of action, stings when administered  
**Dose: 1.5 mL/100 lbs, SC, every 30–45 days for Meningeal worm prevention**
2. **Dectomax** – longer duration of action, need to use higher dose  
**Dose: 2.0 mL/100 lbs, SC, every 45–60 days for Meningeal worm prevention**

**B. Benzimidazoles** – some products have been in use for a long time and in some parts of the country are losing efficacy. Also, there is a wide range of safety, see below for specifics.

1. **Panacur/Safe-guard (Fenbendazole)** – has the widest range of safety, can be used at very high doses. May not always be effective in all animals and in some parts of the country. To make it more effective, give at the high dose, remove feed the night before administering AND/OR give BID. Can also be used at 23 mg/lb, PO, for 5 days for the treatment of Giardia diarrhea in crias. Is very safe to use in pregnant females. Will always be effective as treatment for Meningeal worm infection (23 mg/lb, PO, for 5 to 10 days).  
**Dose: 9 – 23 mg/lb, PO, SID to BID for 3 to 5 days (9 to 23 mL/100 lbs)**
2. **Valbazen (Albendazole)** – has a very narrow margin of safety, should not be used in young crias (< 6 months old) as it can cause fatalities due to liver failure. **DO NOT USE** in pregnant females, can cause facial deformities in crias. Due to toxicities with over dosing, you **MUST** always obtain an accurate body weight and should never use Valbazen in the same animal on consecutive days.  
**Dose: 4.5 mg/lb, PO, Once and repeat in 7 days if needed in severe infections (4.0 mL/100 lbs)**

**C. Strongid (Pyrantel pamoate)** – works by paralyzing the parasite and is effective in horses, cattle, sheep, goats and swine against many parasites. There is minimal research done in camelids, but has been used clinically and seems to be effective. Since it is not frequently used, this drug should be held in reserve for when other, more commonly used drugs no longer work. It has a moderate margin of safety, and should not be used at the same time as Levamisole.

**Dose: 8 mg/lb, PO, Once (4.5 mL paste/100 lbs [180 mg pyrantel base/mL])**  
**(Should be repeated in 7 days to get the newly emerged adults as the drug does not kill the existing eggs already in the animal)**

**D. Levasole (Levamisole)** – works by paralyzing the parasite, which is then expelled alive. It has been used in cattle, sheep and goats for many stomach and intestinal worms, although not effective with *Trichuris* spp and Lungworms. If used as the injectable form or a high dose orally, there may be neurologic side effects. It has a narrow margin of safety and should not be used in debilitated animals unless the benefit outweighs the risk. It is generally considered to be safe to use in pregnant animals, again taking into consideration the benefit versus the risk. This drug should be used only as a last resort, only after more commonly used drugs (Panacur, Valbazen) have failed. As a note, this drug is no longer being commercially made, but is available to your veterinarian at compounding pharmacies (Cornerstone Pharmacy 877 – 581 – 8828)

**Dose: 4 mg/lb, PO, Once** (Should be repeated in 7 days to get the newly emerged adults as the drug does not kill the existing eggs already in the animal)



**NOTE:** this list represents the most commonly used de-wormers, your veterinarian may use other drugs based on personal experiences

**E. Marquis (Ponazuril)** – used to treat *Eimeria macusaniensis* (E. mac) infection in camelids. No research has been done yet on the efficacy of Ponazuril on E. mac in camelids; however research done in calves shows that it is well absorbed. It is also effective on regular coccidia and is the preferred drug of choice to use in adults with coccidia. There is some clinical evidence that this drug may also work against *Cryptosporidium* diarrhea. The product is intended for horses and is too concentrated to use undiluted in alpacas. The recipe for dilution is to take 40 mL of the drug and add 20 mL of distilled water, mix well. This makes a 100 mg/mL suspension.

**Dose: 9 mg/lb, PO, SID for 3 to 5 days**

**F. Metronidazole (Flagyl)** – used to treat *Giardia* diarrhea in young crias, should not be used in crias > 2 months of age.

**Dose: 23 mg/lb, PO, BID for 5 to 8 days**

**G. Humatin (Paromomycin Sulfate)** – used to treat *Cryptosporidium* diarrhea in young crias. If a severe case, use double dose and double the days of treatment. It comes in capsule form that will need to be taken apart and the powder mixed with water in a syringe. This is a human drug and expensive, but it is the most effective treatment for *Cryptosporidium* diarrhea. This drug is also available to your veterinarian at Cornerstone Pharmacy (877 – 581 – 8828).

**Dose: 11 – 22 mg/lb, PO, BID, for 5 to 10 days (1 capsule/20 lbs)**

### Miscellaneous Drugs

**A Kaolin Pectate** – to help control moderate diarrhea in crias and adults. These are estimated doses, each animal needs to be monitored for what works for them.

**Dose: Young crias – 5 to 7 mL, SID to BID as needed**

**Older crias – 7 to 10 mL, SID to BID as needed**

**Yearlings – 12 to 15 mL, SID to BID as needed**

**Adults – 20 to 30 mL, SID to BID as needed**

**B. Imodium** – to help control severe diarrhea in crias and adults, to be used with Kaolin. These are estimated doses, each animal needs to be monitored for what works for them.

**Dose: Young crias – 3 mL, SID to BID as needed**

**Older crias – 4 to 5 mL, SID to BID as needed**

**Yearlings – 5 to 7 mL, SID to BID as needed**

**Adults – 7 to 10 mL, SID to BID as needed**

You can mix Kaolin and Imodium together in one container (3 part Kaolin: 1 part Imodium) for convenience and use the Kaolin dose amounts.

**NOTE: it is important to determine the cause of diarrhea and not just stop the diarrhea**

**C. Vitamin A & D** – used routinely in crias to help prevent rickets and leg angulation. Do not overdose as can cause organ failure. Injectable form is more consistently absorbed than oral form, but either form is effective. Repeat injectable form every 60 days, repeat oral form every two weeks. **DO NOT** use both forms! There are many products available so the dose needs to be calculated carefully based on the product used. Always ask your Veterinarian if you have questions prior to dosing. The dosage needs to be calculated based on the Vitamin D concentration in the product.

**Dose: 1,000 mg/lb, SC, every 60 days OR**

**33,000 IU, PO, every 2 weeks**

**D. Bo-Se (Vitamin E & Selenium 1 mg/mL)** – used in crias as a prevention of white muscle disease (Selenium deficiency) and to stimulate the immune system. Also can be used as a general supplement in underweight and geriatric camelids. Can be repeated in 30 days. No information about use during pregnancy is available; however it is routinely used in pregnant cattle. Be very careful only to use the Bo-Se product as Selenium overdoses occur and can be toxic. Anaphylactic reactions have been known to occur, so the animal should be monitored for respiratory failure and collapse.

**Dose: 0.025 mg/lb (1 cc/40 lbs), SC**



**E. Corid (Amprolium)** – used as individual and group medication for treatment and prevention of coccidia in camelids. Keep in mind that it is normal to find some regular coccidia in adult feces and the goal is not to have a completely negative fecal. Only treat adults if they are having clinical disease (severe diarrhea) to regular coccidia. Over dosage and prolonged use of this drug can also induce Polioencephalomalacia, however in this situation, the condition is Thiamine responsive. When treating a group, must be the only source of water available. Is not a suitable treatment in the water for young crias, as they do not drink enough water to medicate themselves. Follow label directions, do not just add drug to remaining water, pour out remaining water and give fresh daily.

**Dose: 1 oz/5 gallon water**

**4 oz/25 gallon water**

**8 oz/50 gallon water**

**F. Thiamine (Vitamin B1)** – used for the treatment of Polioencephalomalacia and any neurologic disease. Should only be used with direction from your veterinarian. Concentrations vary with different products, so calculate amount to be administered carefully. Can cause neurologic signs if too much is administered. Must be used with extreme caution if given IV as it can cause seizures. Start with lower dose, increase only if the animal is not responding (still depressed, blind).

**Dose: 4.5 – 18 mg/lb, SC, SID to QID**

**G. Clostridium type C, D & T toxoid (CD&T injection)** – most commonly used vaccine in camelids. Mainly used to prevent tetanus in camelids. Unless a specific problem in your area, the "8-way vaccine" is not recommended. Many different dosing protocols exist, no research on the best way! This is the schedule I recommend:

**Day 2: 2 mL, SC**

**Day 30, 60, 6 months, yearly: 3 mL**

**Dams: 3 mL, 2 days after giving birth**

In conclusion, as stated above, I have provided this information to be a helpful guideline only. It is NOT meant to replace your local veterinarian. Many of the drugs listed, even the nonprescription ones can have fatal consequences if used inappropriately. The information is correct to the extent that information is available. Please share this information with your veterinarians. If you have any questions, please ask your local veterinarian or call Dr. Walker at Alpaca Jack's Suri Farm – 419 – 423 – 3890.

## References

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