FAMU 006

The Herd Health Handbook for Goat Producers: Biosecurity at the Farm Level[1]

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Introduction

Bio-security (biological safety and well-being) is the management practices that prevent infectious diseases from being carried into a herd. The goal of a bio-security program is to stop the transmission of disease-causing agents by preventing, minimizing or controlling cross-contamination of body fluids between animals, animals to feed, or equipment that may directly or indirectly contact animals. Effective bio-security management practices are designed to prevent the spread of disease by minimizing movement of biological organisms and their vectors onto and within the premises. These management practices are based on the principle that it is easier to prevent disease than it is to treat or react to a problem caused by disease.

The advantages of adopting a bio-security program are numerous. An effective program can improve the cost-efficiency of the farm, improve the reputation of the producer, and allow the producer to better maintain the health status of the herd. A bio-security program is one of the most effective means of disease control available, and no disease prevention program will work without it.

Disease: Its Causes and How it is Spread

One of the first steps that must be taken to implement a bio-security program is to learn what causes disease and illness so that it can be prevented. Diseases and ill health are the result of bacteria that cause caseous lymphanitis, viruses as in the case of CAE (caprine arthritis encephalatis) and pinkeye, or by parasites such as coccidia and Haemonchus. The spread of disease is multifactorial. It depends on the immune state or condition of the animal, the environment temperature, equipment, stocking rate, condition of the pasture, etc., and the sources of transmission. The key to a good bio-security program is to break the transmission of disease or minimize its effect. Issues that must be considered in the spread or transmission of diseases in a goat herd are:

1. The introduction of diseased goats or healthy goats incubating the diseases, also known as carrier animals;
2. The possibility of contamination by vehicles, equipment, clothing, etc;
3. Contact with contaminated inanimate objects;
4. Proper and timely disposal of carcasses of dead animals;
5. Proper management of feedstuffs and water to ensure that they do not become contaminated;
6. The proper handling of manure; and
7. The control of non-livestock vectors (other animals that can carry and spread the disease such as insects and arthropods).

Aspects of an Effective Bio-security Program

The issues that an effective biosecurity program must address can be quite complicated and diverse as seen in the diagram below (Figure 1). This is because of the many routes through which diseases can be spread. Although the issues that a bio-security program must address are diverse and complicated, the management practices that are a part of an effective program are usually simple and easy to incorporate into a normal production system.

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One of the first and most important aspects of a bio-security program that should be incorporated into the management plan of a producer is to know what is normal and abnormal both in the live animal and at slaughter. This requires that the owners and the inspectors are on the same page. The following diagram is an example of conditions or signs that an inspector looks for in order to decide if there is indeed a health problem. This is also a good list of symptoms for a producer to look for in order to be able to know the health status of his or her herd or individual animals.

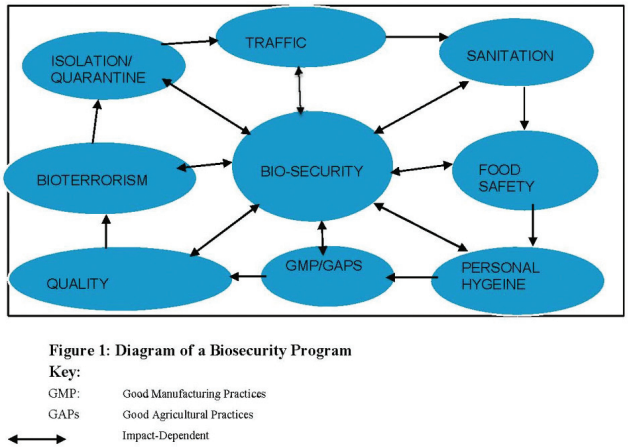

Figure 1. Diagram of a Bio-security Program

Table 1. Health Alerts

Healthy Goats	Signs of Illness
Good appetite	Poor appetite
Shiny coat	Dull coat, hair falling out
Bright and clear eyes	Runny eyes
Well fleshed	Weight loss
Normal body temperature 103.1 - 104.9°F	Fever 105.8°F or higher
Strong legs and feet	Lameness, swollen joints
Pink gums	Anemic (pale gums)
Firm pelleted stool	Diarrhea
No swelling in any extremities of the body	Swelling in any body parts
Chewing its cud	No sign of chewing cud
Alert	Lethargic
Breathing normal	Labored breathing
Urinates with no difficulty	Strains or cries when urinating

Bio-security Measures

1. The following are some measures and practices that should be adopted by the producer to ensure the safety and health of his or her herd:
2. It is best to prevent problems rather than correct them.
3. It is important that an individual and premises animal identification program is implemented.
4. Keep good records. It is suggested that the records be kept simple. The records should track and validate the different management practices conducted on the farm including the results of routine evaluations performed on the herd (Appendix B).

Other bio-security measures that can be adopted into an effective program are:

1. Attempt to prevent manure contamination by never stepping in the feed bunks.
2. Routinely clean and disinfect feeding and watering equipment, which can be done with chlorine, iodine or Quatenary Ammonia Products (QAPs).
3. Routinely clean and disinfect equipment used to medicate animals, especially equipment used on multiple animals.
4. Provide clean area for restraint, treatment and isolation of sick animals.
5. Consult with a veterinarian or animal health personnel on goats with suspicious symptoms or death.
6. Monitor and manage visitor traffic.
7. Clean contaminated vehicles and equipment.
8. Know health history of herd where new animals are purchased.
9. Know health status of animals brought into herd.
10. Transport animals in clean vehicle.
11. Quarantine and isolate new and sick animals.
12. Sanitarily dispose of dead stock.
13. Have a control program for other animals which could spread disease (rodents, insects, external parasites, etc.)
14. Control manure and dispose of it frequently.

15. Maintain good personal hygiene.
16. Be observant.
17. Maintain a good client-patient relationship with a veterinarian.
18. Have a sound vaccination program.

Food Safety Concerns

As food safety is of a great concern to consumers, it is important that the producer plays his or her part in ensuring that food supply is safe. This can be done by conducting an antemortem inspection of animals before they are sold or slaughtered for human consumption. The inspection should determine if there are signs of physical, biological, or mental problems. This is done by looking at the movement of the animal in addition to the skin, eyes, nose, external reproductive system, mouth and feet. The person that is inspecting the animal is looking for conditions such as caseous lymphadenitis, epithelioma, anasarca, comatose, signs that the animal is dying, animals that are not walking normally or will not stand, missing eyes, bloating, the swelling of joints or briskets, respiratory problems, swollen lymph nodes, lumpy jaws, or signs of central nervous system problems. Some diseases that should be monitored include anthrax, rabies, tetanus, foot and mouth disease, scrapies, brucellosis, and goat and sheep pox (Appendix A).

The producer should know a little about the postmortem inspection. It is usually done simultaneously with the slaughter and dressing process. It is divided into three sections: the head, the viscera, and the rail inspection. The inspector examines and palpates the external surface of the heart. The lymph nodes of the lungs are palpated. The inspector also examines the liver, the bile duct, the spleen, paunch and the intestine. Then, the surface of the carcass, the thorax, abdominal, pelvic cavity, and the kidneys are examined. He will also look for fecal material.

If it is determined that the carcass has the following conditions, it will be condemned and not allowed to enter the system for human consumption:

1. Anthrax
2. Rabies
3. Extreme emaciation
4. Pneumonia
5. Uremic poisoning
6. Tuberculosis
7. Icterus
8. Septicemia
9. Caseous lymphadenitis
10. Abscesses
11. Fecal material

How does HACCP Work?

HACCP (Hazard Analysis and Critical Control Point) allows the producer to converse with his customers using the same food safety blueprint they are required to use. HACCP works at the producer level as it does for customers receiving on-farm products. It requires the producer to conduct a hazard analysis to determine what significant hazards can occur at the farm level. This must be done in order to plan for and execute a program that will prevent or control their occurrence.

The framework of a HACCP-based food safety program is possible at the producer level. Although it will require modifications, its implementation can enhance a farm-to-table approach to food safety and increase the confidence of customers purchasing producer products. This system can also make the management of herd health and other concerns much more user-friendly. Producers are expected to know the role they play in combating food-borne illnesses. Using a sound science-based program will enhance the total food safety approach and give increased credibility to on-farm management programs.

The basic principles of HACCP are:

1. To conduct hazard analysis
2. To establish critical control points
3. To establish critical limits
4. To establish monitoring procedures
5. To establish corrective actions
6. To establish verification procedures
7. To establish record-keeping and documentation procedures

Conclusion

Bio-security is very important to the entire agricultural industry from the producer to the consumer. The producer that can successfully control the introduction and spread of disease on their farm not only benefits himself but the entire industry. The control of disease cuts down on the cost of medication and treatment for the producer and increases the confidence of the consumer in the safety and wholesomeness of the products that are produced by the industry. A good bio-security program is essential to this success.

Although a good biosecurity program must address many issues, it can still be simple and effective at the same time. The implementation of a program that focuses on prevention of disease includes an individual and premises identification program; tracks and validates management practices; keeps the environment sanitary; prevents cross-contamination between clean, healthy, sick and dead goats; and includes routine evaluations that should effectively control the spread and introduction of disease.

References:

Merck & Company, Inc. (2008). Biosecurity: Goats. The Merck Veterinary Manual, http://www.merckvetmanual.com/mvm/index.jsp, Received July 22, 2009.

http://www.jackmauldin.com/diseases.htm. Received August 12, 2009.

Pugh, D. G. (2002). Sheep and goat medicine, 1st ed. pp. 210-211 & 397-398. Saunders, Philadelphia.

Steveson, K. E., & Bernard, D. T. (1995). Establishing hazard analysis critical control point program: A workshop manual 2nd ed. The food processors institute 1350 I Street, N.W., Suite 300 Washington, D. C. 20005-3305.

Appendix A. Diseases-Symptoms and possible treatments.

Disease/Condition	Symptom	Treatment
Acidosis- occurs after consuming large quantities of concentrate foodstuffs.	Depressed, hangs its head, separation from the herd, drunken behavior, muscle twitching, bloat tends to occur, swelling on left flank, may grind teeth.	Stop access to food. Drench goat with something alkaline such as 2-3 ounces of sodium bicarbonate which will help neutralize acid. Walking goat has some value. Contact veterinarian as needed.
Blackleg (Clostridial Myositis) – caused by the soil-borne bacterium, Clostridium chauvei. The disease develops rapidly in affected animals and often deaths occur before the owner has noticed any sickness in the herd.	Often no symptoms are observed; at other times, high fever, lack of appetite, depression, lameness, swelled head, and swellings that appear in the muscles on various parts of the body. Sometimes the leg muscles are involved or the muscles in the region of the back, hip, flank, chest or shoulder. In the latter stage of the disease, these swellings spread and become quite mushy, producing a characteristic crackling sound when pressed with the hand.	May respond to immediate treatment with penicillin or other antibiotics in large doses. If displaying signs of swelled head, need to have vet aid in draining of affected area.

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<u>Bloat</u> – gorging on anything unsuitable such as wet grass pastures or after raiding food bin.	Tightly inflated flanks, biting and/or kicking at abdominal region, misery, collapse	Drench with mineral oil (6-8 fl oz) for an adult, (2+ fl oz) for kids. Walk goat about, massage flanks. “Giving mineral oil is very effective in getting a goat that has overeaten grain to speed that grain on its way. Vegetable oil will add to the digestive load and cause more harm than good. Mineral oil is not digestible, and I have used it with no problems at all. Feed that is overeaten ferments and causes gas, and acidosis to occur, which can lead to death. The object is to speed it out of there without adding to the digestive load.” By Coni Ross. **Suggestion from visitor to Web site:** **First Suggestion-** Mix some baking soda in with the goats feed. They really enjoy it and it takes away bloat. **Second Suggestion -** -15cc Pepto-Bismol orally -5cc SQ Penicillin -5-7cc CD antitoxin SQ Then give another shot of CD ANTITOXIN and Pepto later that day as well to make sure all is okay. Twelve-24 hours later, make sure you give the goat a probiotic to put the live bacteria back into the rumen, which will repopulate the gut once you clean it out.

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Bottle Jaw – Caused by animal being infected with blood-sucking worms. Fluids are leaking from blood vessels and flow to the lower parts of the body. As the animal grazes during the day, the fluids build up in the head. Overnight, the fluids may partially drain away from the head.	Lower face and jaw will dramatically swell especially during the evening. Gums may be pale due to the anemic condition brought on by a large worm load in the animal.	Your deworming medicine may not be effective or you may not have dewormed recently. The animal needs to be dewormed with a strong medication three times with an 11 days interval in between dewormings. So deworm on day zero, day 11, and day 22. If the animal is anemic, give an iron and vitamin supplement. Their immune system will have difficulty fighting off infection so you should use antibiotics for several days to help. As a preventive, use the FAMACHA© approach and check the color of the mucosal lining of the eyelids monthly.
Brucellosis – is an infectious disease caused by the bacteria of the genus *Brucella*. Brucella organisms infect a goat's placenta and udder, causing abortion and mastitis.	Mid to late term abortions, stillborn kids, weak kids, retained placentas and in long-term infections can see lameness due to arthritic joints.	This is a **REPORTABLE AND ZOONOTIC** disease. There is no effective treatment. If you suspect Brucellosis in your herd, contact your local veterinarian immediately.
Caprine Arthritis Encephalitis (CAE) – Virus. Infectious to others.	Knees become enlarged, lameness, weight loss, hard udder. Pneumonia, chronic cough.	Isolate and remove animal from herd. This disease is passed from the dam to the kid via the colostrum/milk in the first few hours of life. Therefore, remove all positive does from the breeding herd.
Caseous Lymphadenitis (CL) – infectious. Bacteria enters animal through break in skin or mucous membranes and localizes in lymph node. Once the animal is infected, they are infected for life.	Abscesses of the lymph glands. NOT ALL abscesses are CL. Your vet can test the animals to see if the abscess is CL or not.	Isolate and remove animal from herd. Many breeders will get rid of animals with CL. Some breeders treat and manage animals with CL. Abscesses can be lanced, discharge removed, and treated with iodine several times. Wear rubber gloves and remove all discharge from the animal and its surroundings. CL is spread through the eruption of abscesses and other animals being exposed to the discharge. Vaccine available at PHL Associates, Inc.

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Chlamydiosis – caused by an intracellular organism.	Off food, diarrhea, blood in diarrhea, rapid weight loss, dehydration, may show straining in attempts to pass feces, dehydration and fever.	You can treat easily with Biosol. Depending on weight, give 2-5cc to kids and 7-10cc to adults orally once a day for 5-7 days. Another treatment is with Corid liquid. Mix half Corid and half water and drench with 1cc per 4 lbs for 5 days. Do not mix more than you will use in a 3-day period. Albon or other medications containing sulfa are available.
Colic – affects young kids when dietary changes are made. Mixing milk replacer at wrong concentration.	Kid is restless, cries out and tends to stand either with its back arched or with its hind feet placed well back.	In mild cases, the pain quickly passes and the animal returns to normal within hours. If not, give ½ pint of vegetable oil for adults and less for kids followed by 1 glass of spirits in 2 glasses of water, repeated hourly until pain stops.
Copper Deficiency and Toxicity – due to decreased levels of copper in the soil, forages grown on soils low in copper. Copper toxicity is rare.	Newborn kids may be swayback, display muscle tremors, head shaking and teeth grinding. In older animals you see loss of appetite, insufficient weight gain, and weight loss.	Furnish loose minerals with sufficient copper content to animals year-round.
Cystic Ovaries	Continues to come into heat every 4-5 days. She will fail to come into a true, standing heat, and she will act “bucky.”	Treat cystic ovaries quite successfully with an injection of HCG (Human Chorionic Gonadotropin, a prescription drug) to correct the hormonal imbalance. That is followed about 9-10 days later by an injection of lutalyse.
Diarrhea – multiple causes, i.e. nutritional, infectious, toxicity, etc.	Watery, possibly foul-smelling feces.	Can initially treat with Pepto-Bismol. Give newborn kids 3cc every 4-6 hours by mouth. Weanlings and adults-5cc every 4-6 hours by mouth. May want to follow this treatment with a rumen stimulator such as Probios.

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Enterotoxaemia – (overeaters disease). Clostridium perfringens type D bacteria produce the poisons responsible, when conditions in the digestive tract deprive them of oxygen.	Sudden loss of appetite. Depression and a drunken appearance. As it progresses the animal becomes unable to stand and lies on side making paddling movements. High temperature. Very watery diarrhea.	The prognosis for recovery is guarded in caprine enterotoxemia, even with treatment. Fluid therapy providing mixed electrolyte solution with bicarbonate is indicated in acute cases to counter shock, dehydration and acidosis. Commercially available type C and D antitoxins should be administered. Antibiotic therapy may be helpful in reducing bacterial proliferation. Oral sulfas have been used with some success.
Floppy Kid Syndrome- some people believe it is caused by too much rich milk and others believe that it is associated with e-coli.	Newborn kids seem to do well for a few days after birth then start to show depression and weakness of limbs that progress to flaccid paralysis. Drunken appearance. No signs of diarrhea or elevated temperature. Possible distension of the abdomen.	Remove kid from source of milk immediately after birth for 24 to 36 hours. Dissolve a teaspoon of sodium bicarbonate in an eight ounce glass of water. With a syringe administer between 20 and 50 cc of the solution orally. Do it slowly so the kid has time to swallow. Repeat the treatment at 1, 3, 6,12 hours from initial treatment. Feed electrolytes as alternative until returned to milk. Also, administer a wide spectrum antibiotic to prevent secondary bacterial infections. **ANOTHER POSSIBLE SOLUTION:** Treatment is one-half teaspoon baking soda, mixed with electrolytes and one-half teaspoon Pepto-Bismol. Repeat in 6-12 hours. Not required to pull from mothers milk from this solutions perspective. **Third Solution** – If the kid can still walk but is wobbly, give 2cc long-acting penicillin IM. The penicillin is imperative for recovery. This should work in 6 hours. If the kid is comatose, give 5cc 50% dextrose orally and keep warm. Give the penicillin and thiamin (500mg SQ) once a day for 3 days.

Appendix A. Diseases-Symptoms and possible treatments.

Disease/Condition	Symptom	Treatment
Foot & Mouth Disease – Viral disease of cloven-hoofed animals.	Blisters or vesicles form in any of the following places: lips, tongue, teats, or the coronary band of the hoof. Tend to become lame and possibly salivate excessively.	This is a **REPORTABLE AND ZOONOTIC** disease. Must be controlled from occurring. Animals exposed to the disease are destroyed. If you suspect FMD in your herd, contact your local veterinarian IMMEDIATELY!
Footrot – Fusiformis nodosus infection enters the hoof and causes inflammation of the sensitive laminae.	Lameness, mild to severe. There is a foul smell associated with it. Animals are reluctant to walk.	Hoof paring in order to remove the undermined hoof. Apply antiseptic agents in order to combat any infection.
Gastrointestinal round worms – infest stomach and intestines sucking blood or reducing the absorption of digested food materials from the gut.	Diarrhea, weight loss, and anemia.	Drench with a dewormer medicine such as *Ivomec or Cydectin. Drug resistance of the parasites may decrease the efficacy of your dewormer. Consult your veterinarian if you suspect drug resistance.*
Goat Polio – see Polioencephalomalcia.		
Indigestion –failure of normal ruminal movement. Associated with high intake of concentrated foodstuffs.	Off of food, slightly dull.	Generally recovers within two days. Sodium bicarbonate given by mouth may be of some use if there is a tendency for acidic conditions to develop in the rumen. Dissolve 25 g of sodium bicarbonate in a saltwater solution and offer it to the animal.
Johnes disease – chronic, incurable infection of the intestines by Mycobacterium paratuberculosis. Causes a thickening of the intestine.	Loss of condition, occasionally scouring, becoming more frequent with bubbles of gas in the droppings. Weakness. Thirst may increase.	None. Remove animal from herd as soon as possible to prevent spread to other animals.

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Ketosis – lactating doe is unable to obtain sufficient amounts of energy and ketones accumulate in the blood from the incomplete metabolism of body fat.	Goes off food. Milk yield falls. Sweet smell in the goats breath.	Give doe propylene glycol or ketoplus twice a day. We recommend 60cc drench in the morning and evening. You can also create a mixture of sodium bicarbonate with water and 30cc drench morning and evening. Help the doe up and moving around during the day, and offer food. Another solution: Give her 3 tbs Calf Pac/ Probios mixed with 100cc Revive (1 bottle 50% Dextrose, 20cc B-complex, 5cc B-12, 2cc 500mg/ml thiamine) and 100cc water. Give the doe 200cc of Revive every two hours, with Calf Pac/Probios in it. Also, once you get the doe awake, always give corn with the sweet feed. Give her at least 6-8 oz. Magic (1 part molasses, 1 part corn, 2 parts Kayo syrup) at night.
Lice – parasite.	Intense irritation, rubbing, bald patches and itching, usually during the winter months.	Louse powder will normally control the problem. Insecticides for spray or dip repeated.
Laminitis – inflammation of the skin layers around the hoof. Often caused by consumption of a highly concentrated or lush forage diet. It may also be associated with sickness such as pneumonia, mastitis, and metritis.	Lameness and warm feet. Moves with a stiff gait, prefers to lie down or stay on knees. May also show signs of bloat, diarrhea and toxemia.	Place on a reduced protein/energy diet such as hay with a reduced concentrate ration and soft bedding for lying down. Pain relief with a non-steroidal, anti-inflammatory drug such as Phenylbutazone is essential. Chronic cases need careful foot trimming to relieve pain by reducing pressure on the sensitive areas.
Listeriosis – caused by the bacteria Listeria monocytogenes, found in soil, water, plant litter, silage and a goats digestive tract. Brought on by feeding contaminated silage, sudden changes in kind of feed, parasitism, dramatic weather changes and advanced stages of pregnancy.	Depression, decreased appetite, fever, leaning or stumbling or moving in one direction only, head pulled to flank with rigid neck, facial paralysis on one side, slack jaw, and drooling, abortions.	Administration of Procaine penicillin every six hours for three to five days, then once a day for an additional seven days.

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Lungworms – worms inhabit the air passages and cause inflammation (parasite pneumonia).	Chronic cough.	Drench with dewormer such as Ivomec
Mange, Chorioptic – Demodex caprae invade the hair follicles and sebaceous glands of the skin.	Small lumps are noticed in the skin. They may be like a cyst or bag of fluid.	**REPORTABLE** disease. Response to treatment is generally poor. If you suspect chorioptic mange, contact your veterinarian IMMEDIATELY!
Mange, Psoroptic – Psoroptes caprae which infest the ears.	May cause head shaking and scratching.	**REPORTABLE** disease. Gamma benzene hexachloride and gammexane can be used. If you suspect psoroptic mange contact your veterinarian IMMEDIATELY!
Mange, Sarcoptic – Saroptes scabei burrow in the skin and lay their eggs in tunnels.	Terrible itching, skin becomes raised, red and hairless around the eyes, ears and nose.	**REPORTABLE** disease. Infestation can be passed to other goats. If you suspect sarcoptic mange, contact your veterinarian IMMEDIATELY! Veterinary treatment is required.
Mastitis – inflammation of the udder, almost always associated with germs.	Misery, udder hot, hard and very tender, appetite lost, pupils of eyes narrowed to slits.	Antibiotics, and supportive therapy.
Mastitis (gangrene) – inflammation of the udder, usually associated with bacterial infection.	Bruised-looking udder. Doe shows signs of generalized illness: depression, fever or loss of appetite. Gangrene mastitis should be suspect if the udder is cold, swollen with an excessive accumulation of fluid and the milk is watery or bloody.	-CD antitoxin -7cc SQ -Poly Serum – 10cc SQ -10cc Penicillin SQ and 5cc IM -Banamine – 1cc/100lbs IM -Follow with 10cc Penicillin SQ per day for 5 more days -If you have Nuflor, give her 6cc/100LBS SQ first day, and 3cc/100 for at least 5 days more.

Appendix A. Diseases-Symptoms and possible treatments.

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Mycotoxin – "Myci means fungus and toxin means poison" – a poisoning of an animal from a fungus growth normally in old hay or feed.	Excessive salivation, depression, anorexia, convulsions, arched back.	Varies according to the source of problem. Remove the "bad" feed and/or hay from the animals immediately. Administration of activated charcoal may inhibit additional uptake of toxin from the gut. Mineral oil may help.
Navel Ill – dirty environments infecting the navel cord after birth.	Young kids with swollen, painful navel which may look red.	Antibiotic injections. Area around the navel should be cleaned with antiseptic iodine, crusty scabs removed by soaking and any pockets of pus drained.
Pinkeye – infection of the eye spread by agents such as flies, dust and long grass.	A watery eye with excess tears spilling over onto the skin. May be reddened and cornea becomes cloudy. Animal sensitive to the light.	Flush eyes with 1cc of penicillin or an oxytetracycline ophthalmic solution and give 3cc oxytetracycline antibiotic SQ for several days. Isolate animal from others to keep it from spreading. Condition will resolve on its own in 3-4 weeks.
Pneumonia – infection of the lung.	Refuses food, stands around hanging head down, sounds congested, elevated temperature, and coughs and breathes rapidly or with difficulty-harsh lung sounds.	Antibacterial drugs such as oxytetracycline (LA-200), Tylan 200 or Naxcel may be used. Antibiotics may need to be administered by a veterinarian.

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<u>Polioencephalomalcia (Goat Polio)</u> – a thiamine (Vitamin B-1) deficiency and/or sulfur toxicity. From improper feeding, particularly feeding too much grain and too little roughage.	Excitability, "stargazing," muscle rigidity, uncoordinated staggering and/or weaving, drunkenness, circling, diarrhea, muscle tremor, head against wall, and apparent blindness. A rapid involuntary, oscillatory motion of the eyeball. As it progresses, convulsions and high fever may occur, and if untreated, the animal generally dies within 24-72 hours.	Thiamine is the only effective therapy, and treatment can result in improvement in as little as two hours, if the disease is caught early enough. Dosage is related to body weight: Use 500mg/ml thiamin. Start with a gram (1000mg) IM for the first dose, then at least 500mg per day for as long as it takes for complete recovery. Give 10cc penicillin orally, and 10cc SQ at first treatment. Polio can be caused by plant thiaminase, or bacteria that either inhibit production of thiamin in the goats gut, or consume the thiamin. Since we dont know what the origin is, it is preferred to sterilize the gut, and start over. So, the oral penicillin will kill the bacteria if that is the cause. On the morning of day 2, give the goat the Calf Pac and 500mg Thiamin orally, and 500 mg SQ. Do not repeat any of the penicillin. If the goat will eat, feed her. If she cant eat, tube her or drench her with 100cc of Revive (1 bottle 50% Dextrose, 20cc B complex, 5cc B12, 2cc 500mg/ml thiamine), 100cc of water several times a day until she can eat.

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Pregnancy Toxemia – a metabolic disease of does in late pregnancy. Most of the nutrition is going to the kids. Similar to ketosis. Ketosis is after birthing.	Lethargy and losses of appetite over one to two weeks, generally in very late pregnancy. Limping or swelling of feet. Lying around not wanting to get up. Sweet-smelling (ketotic) breath. Ketosis strips can be used to identify if the doe is ketotic.	Give doe propylene glycol or Ketoplus twice a day. We recommend 60cc drench in am and pm. You can also create a mixture of sodium bicarbonate with water and give 30cc drench am and pm. Help get the doe up and moving around during the day and offering food. **Another solution**: give her 3 Tbs Calf Pac/ Probios mixed with 100cc Revive (1 bottle 50% Dextrose, 20cc B complex, 5cc B12, 2cc 500mg/ml thiamine) and 100cc water. Give the doe 200cc of Revive every 2 hours, with Calf Pac/Probios in it. Also, once you get the doe awake, always give alfalfa, and corn with the sweet feed. Give her at least 6-8 oz. Magic (1 part molasses, 1 part corn oil, 2 parts Kayo syrup) at night.
Q Fever – a bacterial disease capable of being transmitted from animals to people caused by Coxiella burnetii, a rickettsial organism. Animals shed the organism in their urine, feces, milk, and especially in their birth products.	Abortion or stillbirths occur in late pregnancy, but only when the placenta has been severely damaged.	This is a **REPORTABLE AND ZOONOTIC** disease. Treatment is with tetracycline. Placentas and aborted fetuses should be destroyed by burning. If you suspect Q-Fever in your herd, contact your local veterinarian IMMEDIATELY!
Ringworms – Fungal condition.	Grey-white crusty appearance on small areas of skin. Skin is usually thickened and the hairs thin or absent. Generally, no itching or evidence of irritation. Enlargement of affected areas occurs.	Fungicidal preparations applied as a liquid dressing. Any of the following daily for five days and then weekly:? -0.5% lime sulphur -1:10 bleach -1:300 Captan -1% Betadine

Appendix A. Diseases-Symptoms and possible treatments.

Disease/Condition	Symptom	Treatment
Sore mouth - Contagious Pustular Dermatitis (ORF) – highly infectious viral disease to animals and humans. ORF is the name for this in humans.	Pimples about the nose, mouth, eyes, anus and hoofs turning to watery blisters, then to sticky and encrusted scabs. Swelling of mouth and gums. Will run a course of around three weeks. Animals can die if they are unable to eat or nurse because of the sore mouth.	Difficult. Dress with antibiotic spray or ointment. Isolate infected animals. There is an Ovine Ecthyma Vaccine against sore mouth infection for all animals. Giving the vaccine to infected animals may reduce the time to recover. **We do not recommend vaccinating**. Recommend letting the sore mouth run its course of 3 weeks and treat the severe cases. Use medication with Cephapirin Benzathine in it. Two brands are Cefa Dri and Tomorrow. CHX-Guard LA gel antibacterial agent adheres to the gums of infected animals.
Tapeworms – inhabit the small intestine.	Examination of the goats droppings. Young goats will pass tapeworm segments (looks like grains of white rice) in their feces during the summer months.	An anthelmintic such as albendazole can be used. Oral niclosamide is highly effective.
Tetanus – infection of open wounds by the bacterium Clostridium tetani results in tetanus (lockjaw).	A general increase in muscle stiffness is seen, causing an unsteady gait. Eyelid begins to extend over the eye and animal looks “anxious.” The symptoms get progressively worse and convulsions may occur. The goat dies because it is unable to breathe.	Goats can be treated with antibiotics such as penicillin and antisera, but response is poor. The site of bacterial proliferation should be searched for and whenever possible, the wound or infection site should be opened to the air, debrided, flushed with hydrogen peroxide and infiltrated with penicillin. The area is infiltrated with tetanus antitoxin before the wound-cleaning process is begun to reduce the chance that more preexisting toxin will be absorbed during tissue manipulations.
Toxoplasmosis – this is associated with a coccidium of cats. Cats become infected by consuming uncooked meat scraps, placentas, and small rodents. Goats become infected by eating grass, hay or grain contaminated by cat feces.	It can result in abortion, stillbirths and weak kids. Reducing exposure to cat may help but it may lead to an increase in rats that carry other diseases.	No effective treatment at this time.

Appendix A. Diseases-Symptoms and possible treatments.

Disease/Condition	Symptom	Treatment
<u>Urinary Calculi (Urolithiasis)</u> – a hard mass of mineral salts in the urinary tract caused by a dietary mineral imbalance, usually in bucks.	Restlessness, straining to urinate, pawing the ground, recurrent looking at its own abdomen, vocal signs of pain.	Most treatment must be done by veterinarians. Often requiring the removal of the tip of the penis. Or surgical removal of the calculi from the bladder and/or urethra.
<u>White Muscle Disease</u> – deficiency of Vitamin E and Selenium.	Stiffness, weakness and trembling. Back legs become stiff and unable to use. Can result in death.	Administration of selenium, together with vitamin E. Link to a map showing counties Selenium levels: http://tin.er.usgs.gov/geochem/doc/averages/se/usa.html.

Appendix B. Examples of Records

TREATMENT RECORD						
Treatment Date &Time	**ID #**	**Condition Treated**	**Lbs. Body Wt.**	**Treatment given, Drug Dose & Route**	**Withdrawal Complete Date & Time**	**Extra-label Use Vet & Instructions**

Appendix B. Examples of Records

ANTIBIOTICS TREATMENT RECORD								
ID of animal	**Name of drug**	**Used for**	**Route**	**Amt.**	**W/T**	**Cost**	**Date given**	**VCPR**

Appendix B. Examples of Records

DEWORMING TREATMENT RECORD						
ID of Animal	**Name of Dewormer**	**Date**	**Wt.**	**Route**	**Withdrawal**	**Cost**