

# Livestock Health Series Dairy Herd Vaccination Program

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## Introduction

Maintaining an effective animal health program is an essential part of a successful dairy enterprise. Good animal health is vital for maximum production since cattle must be healthy to reach their performance potential. Studies show that two out of three cows are culled from dairy herds for reasons other than low production.

Since each dairy operation is unique, each owner should work with his/her veterinarian to create a herd health plan. Accurate records, including information on medications, vaccinations, wormers, injuries, production, breeding and culling, should be kept on each animal. This information should be used to plan a herd health program. A vaccination program is only a portion of a herd health plan.



**Dairy cows need to be healthy to obtain maximum benefits from good feeding.**

It is important to implement a sound herd health program before a disease outbreak occurs. Recommended dairy cattle vaccination

programs depend upon the type of operation and the area of Arkansas. Consult your veterinarian to determine specific vaccinations for your area.

## Developing a Vaccination Program for Your Herd

A sound vaccination program requires planning and consultation with your herd veterinarian who will be aware of the diseases of importance in your area. The common dairy cattle diseases for which vaccines are available are discussed in Table 1.

Several questions need to be answered before designing a vaccination program: Why? With what? When? How? Identifying and implementing the answers to these questions will help make your vaccination program successful.

**Why?** Livestock are vaccinated to reduce the economic losses associated with disease. It is usually less expensive to prevent than treat a disease. Many effects of diseases are obvious, such as abortion, diarrhea and respiratory disease. Most diseases can be subtle, showing no outward signs, but can significantly reduce efficiency of production. Vaccination stimulates

the animal's immune system to produce protective antibodies that will help combat the invading disease organisms in the animal's body.

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**Table 1. Diseases Included in a Vaccination Program<sup>1</sup>**

Disease	Symptoms	Prevention
Clostridium (Blackleg 7-way)	Sudden death and may include swelling in parts of animal.	Vaccination at 2-6 months with two vaccinations 2-6 weeks apart. Annual booster.
Vibriosis ( <i>Campylobacter</i> )	Abortions in early pregnancy; several services per conception; irregular heat periods.	Use A.I. and vaccinate yearly if a problem.
Leptospirosis	Abortions any time; high fever, poor appetite; bloody urine, anemia, ropy milk.	Vaccination at 4-6 and 12-16 months plus yearly. Keep cattle away from other classes of animals that can be carriers of Lepto.
Brucellosis	Abortions in last third of pregnancy; retained afterbirth; several services per conception.	Calfood vaccination at 4-12 months (4-8 months preferred); use A.I.
Bovine respiratory disease complex (BRDC) or shipping fever	Respiratory disease, high fever, nasal discharge, coughing, rough hair coat if severe; can be very mild.	Vaccination at 4-6 and 12-16 months, yearly and before severe stress periods for viral (IBR, BVD, PI <sub>3</sub> and BRSV) or bacterial (Mannheimia or Pasteurella) causes.
Warts	Crusty cauliflower-like overgrowths of skin.	Good sanitation, vaccination.
Foot rot	A break in the skin or hoof, usually between the toes, allowing bacteria to enter. Rapid progressive lameness, swollen foot, characteristic foul odor.	Clean, dry yards; disposing of foreign materials that might cause a break in the skin or hoof, trim feet, vaccinate if chronic problem.
Ringworm	Gray, crusty patches on skin, usually circular, most often on head and shoulders.	Usually disappears when animals are let out in spring sunshine.
Diarrhea (scours), <u>viral</u> or <u>bacterial</u> ( <i>E. coli</i> , <i>Salmonella</i> , <i>Rotavirus</i> or <i>Coronavirus</i> )	Temperature, watery feces, may be cold to the touch, sunken eyes, skin slowly returns to normal after being pinched up.	Feed colostrum at birth. Individual stalls or pens for calves less than 2 months old. Do not overfeed. Do not overcrowd. Vaccination of dams in 3rd trimester with specific agent to build colostral antibodies. Vaccinate calves immediately at birth.
Hairy heel warts (foot warts)	Cows with reddened area on back feet between the toes on the back of the foot; advanced raspberry-like lesions with protruding hairs.	Dry environment; maintain closed herd; spray feet of infected cows with antibiotic solution such as oxytetracycline; vaccinate.
Anthrax	Sudden death with bloody discharges, history in area.	Vaccinate; DO NOT OPEN CARCASSES where death due to anthrax is suspected.
Trichomoniasis	Poor fertility, irregular heat periods.	Use A.I., vaccinate.
Mastitis	Infection of the mammary gland caused by one of several bacterial organisms. Swollen and painful udder, sometimes causing the cow to go off feed; chronic cases may produce only flaky milk and, in time, result in uneven quarters and slow milking.	Effective dry cow treatment in combination with regular use of a good teat dip after each milking; milking system of proper design and installation maintained regularly; follow well-managed milking procedures; in specific cases, vaccination may be helpful.
Pinkeye	Inflammation of eye; cloudiness of cornea, watery eye with reddening of eyeball and swelling of eyelids.	Good insect control, vaccination, isolate infected animals if possible; treat with antibiotics, commercial sprays, or patches on eye to prevent spread.

<sup>1</sup>Programs should be based on diseases in herd and area.

**With what?** There are many vaccine products available on the market. They may be obtained from your veterinarian or purchased over the counter. There are a lot of opinions about which is the best product. The best product is the one that will provide protection from the disease organisms for which your herd is at risk. **Consult with your veterinarian for recommendations.** Most of the products on the market today are high quality and should work well if used properly. If the vaccine is purchased over the counter, make sure to read the instructions regarding the disease organisms that the product contains and how the product should be administered.

The most common vaccines on the market are either **killed or modified-live**. In general, most killed vaccines must be administered twice, two to four weeks apart. It takes approximately four to six weeks after the initial vaccination before the animal's body will be able to respond to exposure to disease. A modified-live vaccine contains the disease organism that has been altered so that it may replicate but not make the animal sick. The animal can respond to a modified-live vaccine more quickly and usually only one vaccination is required. Modified-live vaccines are typically not recommended for pregnant animals.

Yearly boosters are recommended for both modified-live and killed vaccines. It is critical to always read the vaccine instructions carefully and follow them.

**When?** Deciding when to vaccinate is dependent upon several factors. One needs to be concerned with when the animal (herd) will be at the highest risk for disease exposure. The age of the animal and its state of production are also considered. Reproductively active cows and bulls will be at highest risk for reproductive diseases prior to and during the breeding season.

It was discussed in the previous section that a specific time span is needed to develop protection once the animal has been vaccinated. Vaccination of breeding animals 30 to 60 days prior to breeding season would be optimal for the prevention of reproductive diseases. The best protection against diseases that affect the newborn calf can be found in the colostrum or "first milk." Vaccination of the cow 30 to 60 days prior to calving will help with the production of high quality colostrum.



Calves should receive high quality colostrum.

**How?** Good vaccination technique is critical to the success of a vaccination program. This includes the proper handling of vaccines and use of proper, clean equipment.

Vaccines should be kept cool in the summer and kept from freezing in the winter. Modified-live vaccines are sensitive to UV light and should be kept out of the sunlight. Once a bottle of modified-live vaccine has been opened, it should be used within one hour. Unused vaccine should be thrown away.

The mixing of different vaccines can render them ineffective. Manufacturers have designed their products to be mixed according to directions. They will not guarantee the product if directions on the label are not followed.

**Avoid going back into an opened vaccine bottle with a used needle. This will contaminate the product.** Use a filling needle that remains in the bottle. Multi-dose syringes will help to minimize the number of times vaccine is drawn from the bottle.

Most vaccines are administered under the skin (subcutaneously) or in the muscle (intramuscularly). The Beef Quality Assurance (BQA) Program recommends that all vaccinations be given in front of the shoulder to avoid vaccination abscesses in the more valuable parts of the carcass.



Subcutaneous vaccination in front of the shoulder is most often recommended.



Intramuscular injections in the rump or thigh may be used if subcutaneous injections do not fit the situation.

Needle size is important. An 18-gauge, 1½-inch needle should be used for intramuscular injections on most cattle. A 1-inch needle can be used on smaller calves. An intramuscular injection should be administered at a right angle to the animal. A 16- to 18-gauge, ½- to ¾-inch needle should be used for subcutaneous injections. The skin should be tented (pulled away from the body) in order to avoid an intramuscular injection.

Needles should be changed frequently (approximately every 10 head) and kept clean during the vaccination process. **Do not clean needles and syringes used for modified-live vaccines with disinfectant. This may inactivate the vaccine.** Remember to dispose of needles properly and safely. Have a container designated for needle and syringe disposal. Clean used syringes thoroughly. Mild soap may be used for syringes that will be used with killed vaccines. It is a good idea to dedicate multi-dose syringes for a particular purpose. **A multi-dose syringe can be labeled and used with modified-live vaccines only. It should not be cleaned with soap or disinfectant. Residues in the syringe can inactivate any modified-live vaccines used later.**

## Reasons for Vaccine Failure

Effective vaccination is dependent upon having a healthy animal that is capable of responding to the vaccination. It should be noted, however, that not all vaccination is 100 percent effective. The number one reason for vaccine failure is not following the directions on the label. Manufacturers work hard to ensure

that you receive the highest quality and most effective product they can provide. If you follow the guidelines above, there should be minimal problems.

Tables 2 and 3 illustrate diseases to include in a vaccination schedule and specify conditions that dictate such vaccination programs. Remember that exposure to disease on each farm varies; therefore, vaccination programs may vary from farm to farm, county to county and between states. Follow the advice of local veterinarians since they are most knowledgeable about diseases in your area. If you administer vaccines yourself, follow directions carefully with regard to site of vaccination and care of the vaccine.

**Table 2. Vaccination Schedule: Cows and Bulls<sup>1</sup>**

<b>Recommended Vaccines</b>	<b>Time to Vaccinate</b>
IBR	Annual
BVD	Annual
PI <sub>3</sub>	Annual
BRSV	Annual
Leptospirosis (5-way)	Annual (every 3 to 6 months in some areas)
<b>Optional Vaccines – Use as Needed</b>	<b>Time to Vaccinate</b>
Vibriosis	Annual (30-60 days before breeding) <sup>2</sup>
Trichomoniasis	Annual (30-60 days before breeding) if needed
Pinkeye	As needed
Anthrax	Annual
Blackleg 7-way	Annual
Anaplasmosis	As needed
Foot rot	As needed
Mastitis	As needed, primarily for <i>Staphylococcus aureus</i>
Hairy heel warts	As needed
<i>E. coli</i> for scours	Vaccinate dry cows and/or calves

<sup>1</sup> Some vaccines require two doses; follow manufacturer's recommendation.

<sup>2</sup> Recommended for bulls.

**Table 3. Vaccination Schedule: Calves and Heifers<sup>1</sup>**

<b>Recommended Vaccines</b>	<b>Time to Vaccinate</b>
Blackleg 7-way	At 2-6 months and 12-16 months
IBR-BVD-PI <sub>3</sub> -BRSV	At 2-6 months and 12-16 months
Leptospirosis	Before breeding and every 6 months
Brucellosis	Heifers (4-12 months)
<b>Optional Vaccines – Use as Needed</b>	<b>Time to Vaccinate</b>
<i>Pasteurella</i>	At 2-6 months and 12-16 months
<i>Haemophilus somnus</i>	At 2-6 months and 12-16 months
Vibriosis	Before breeding
Pinkeye	As needed
<i>E. coli</i> for scours	Vaccinate springing heifers (twice 30 days before calving)
Rota and Corona virus for scours	Vaccinate springing heifers (twice 30 days before calving)
Anthrax	As needed
Ringworm	As needed
Warts	As needed
Foot rot	As needed
Diarrhea	As needed

<sup>1</sup> Some vaccines require two doses; follow manufacturer's recommendation.

## Conclusion

Vaccination programs should always be customized for your operation. Items to consider while establishing a vaccination program include geographic region, type of cattle operation, frequency of introducing new cattle, post vaccination problems and export or interstate shipping requirements.

For best results, always follow the manufacturer's recommendations for dosage, method of administration, number of times given and proper storage. Work with a veterinarian who is familiar with your dairy cattle operation to set up the vaccination program.

## References

*The Merck Veterinary Manual*, 2005. Ninth Edition. Merck and Company, Inc., Whitehouse Station, NJ.